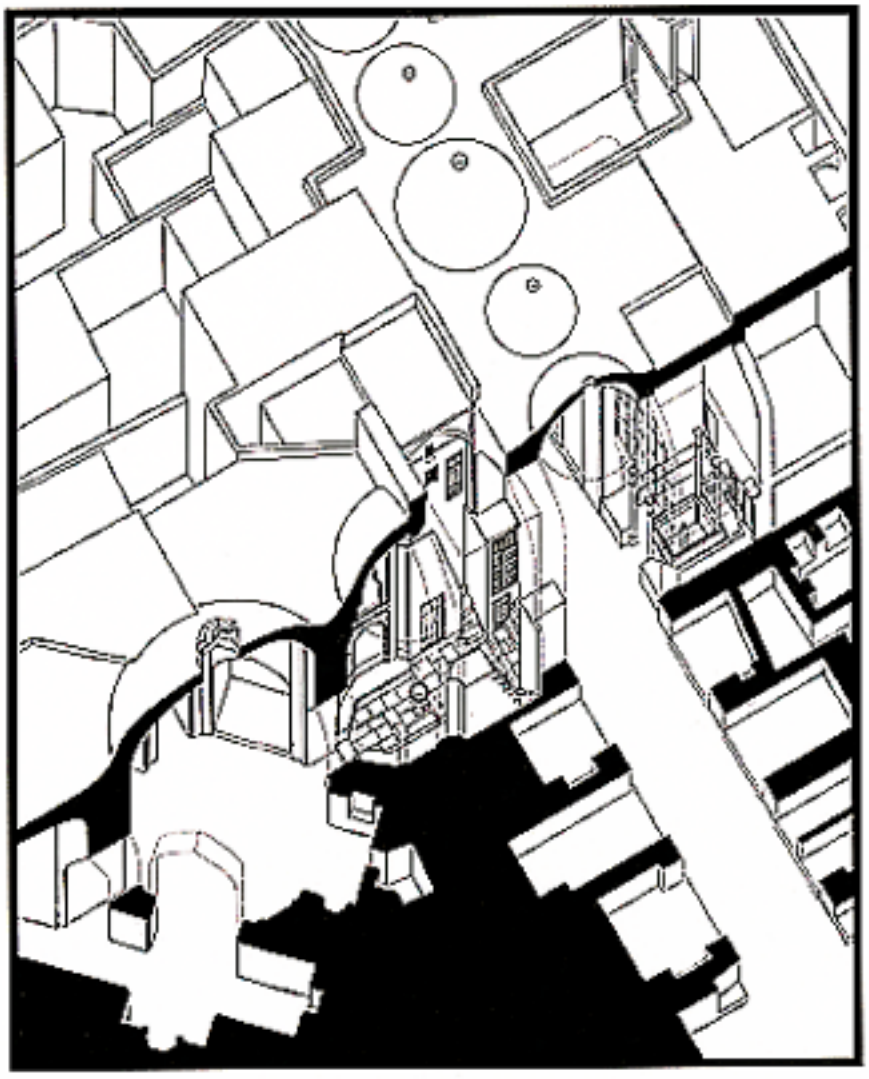
FORMAL STRUCTURE IN ISLAMIC ARCHITECTURE OF IRAN AND TURKISTAN



KLAUS HERDEG

Preface by Oleg Grabar

RIZZOLI
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FORMAL STRUCTURE IN ISLAMIC ARCHITECTURE OF IRAN AND TURKISTAN

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Klaus Herdeg

Preface by Balkrishna V. Doshi

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Acknowledgments

This publication and the exhibition associated with it are the result of a three month journey to Iran and Turkistan undertaken in the spring and early summer of 1975 and a shorter trip to Chinese Turkestan in 1981 by the author. A Wheelwright Travelling Fellowship from the Graduate School of Design at Harvard University provided the impetus. The second trip was subsidized by the Aga Khan Award for Architecture.

I would like to thank Oleg Grabar, professor, History of Art and Architecture at Harvard University and William Porter, professor of Architecture and Planning at the Massachusetts Institute of Technology, for their encouragement. I am also grateful to A. Shirazi in Isfahan, K. S. Kriukov in Tashkent, and V. L. Voronina in Moscow who provided crucial access to research material.

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I am most indebted to a group of former and current architecture students at Columbia, without whose dedicated and critical work this ambitious undertaking would never have seen the light of day. In chronological order the collaborators most involved over the years are: Amy Anderson, William Fellows, Robert Lane, Barbara Laskey, William Griffin, and Richard Martinez. Others, whose contribution varied in kind and intensity are: Susan Hagen, Gil Snyder, Nancy Holwell, Steven Elmets, Ann Kalla, Geoffrey Siebens, Peter Shubert, Frances Campani, Philip Dordai, Kyle Kinsman, Frederick Shands, Mark Regulinski, Gregory Kiss, and Terrance Brennan. To the whole illustrious team go my heart-felt thanks. I feel privileged to be able to offer an internship eminently compatible with graduate studies in architecture. I want to express my special appreciation to Zeynep Celik for her editorial help.

Credits

Except for a handful of historical illustrations, all drawings are original and the photographs were taken by the author unless noted otherwise.

Most exhibition photo mechanical work was done by Independent Printing Company, New York City. Large exhibition panoramas were printed by McGovern and Pivoda Photo, New York City, while all other enlargements were done by Vincent Tcholakian of Diana Custom Photographic Lab., New York City.

Page 18: Miniature, *Zal Consults The Magi,* detail from a page in the Houghton *Shah-Nameh,* attributed to Sultan Muhammed and Painter D., Persian, mid-1520s. The Metropolitan Museum of Art (Gift of Arthur A. Houghton, Jr., 1970).

Page 49: Garden Carpet, northwest Iran, 19th century. The Brooklyn Museum (Bequest of Mrs. Joseph V. McMullan, Gift of the Beaupre Charitable Trust in Memory of Joseph V. McMullan, 1984).

Page 36: Kerman, aerial view, © Geographic Society of Iran.

Contents

Acknowledgments and Credits 4

Foreword 6

Preface—*Oleg Grabar* 9

Introduction 11

Isfahan 13

- Maidan-I-Shah 15
- Mosque Al-Hakim 21
- Madrasa Madir-I-Shah 25
- Bazaar: Caravansarai-I-Gulshan Mosque-I-Jarchi 30
- Bazaar: Amenity 34

Kerman 37

- Hammam Ganj-I-Ali Khan 38

Two Houses, Yazd 41

House with Garden, Nayin 46

Three Gardens: Yazd, Kashan, Shiraz 49

Three Cities in Turkistan 53

- Samarkand 54
- Bukhara 57
- Two Houses, Bukhara 62
- Khiva 64
- Three Houses, Khiva 69

Religious and Mortuary Complex, Kashgar 70

Foreword

Formal Structure in Islamic Architecture of Iran and Turkistan is a sequel to another study I undertook in the late sixties on *Formal Structure in Indian Architecture.* This study "completes" the geographical and historical triangle formed between Iran, Turkistan, and India.

The new study is based on a travelling exhibition of the same title, of which the panels are reproduced here. Most of the panels measure 30 by 36 inches, but a few as much as 60 by 72 inches. In order to convey a visually more comprehensive view of the material presented, full-page color photographs have been added to this volume, with short text to explain the images and their context.

This foreword sets the stage for the preface by asking a central question: why undertake such a study and why do it in this way? The two parts of this central question appear to me like two sides of the same coin.

Our society assumes that the printed word commands authority, or even expresses the truth itself. This attitude dominates the everyday, and certainly academic and other intellectual discourse. As an architect and critic with an abiding interest in formal structures, I believe their study helps us to understand and design the world around us. I see images, especially drawings, as my "text." Visual discourse may be parallel, or even symmetrical, to written or spoken language, but it is more difficult to decipher, and thus one may be rewarded with the prize of a "primary discovery." Observant eyes are not enough. Meaning, to be fully revealed to oneself and to others, especially beyond what is visible, requires formulation. At times photography will serve the purpose. More likely the orchestration of photos, scaled drawings of various kinds, analytical diagrams, and explanatory text will represent an architectural condition inviting the viewer to continue the *interpretations* intended by the author. Sometimes, surprising new interpretations arise, even years after a particular study has been committed to paper.

To understand formal structure in architecture, it is imperative to see and experience, on site, as many artifacts, buildings, ensembles, and cities as possible. Documentation, interpretive scale drawings, diagrams, and text follow.

Instead of preempting my definition of formal structure as it appears in the preface, I find it helpful to illustrate here the significance of formal structure by referring to some readily accessible examples. Francis Bacon, the sixteenth-century English philosopher, compared the shapes of tables in terms of their effects on promoting, or inhibiting, a certain kind of discourse.

> A long Table, and a square Table, or seats about the walls, seem Things of Forme, but are Things of Substance; for at a long Table, a few at the upper end, in effect, sway all the Businesse; but in the other Forme, there is more use of the Counsellours Opinions, that sit lower. (from "Of Counsell")

The perceived significance of a long, rectangular table depends upon a specific hierarchical political/social symbolism—that of a monarch sitting at the "head" of a long table, projecting or receiving the predominant axis. The "foot" of the table usually remains empty. A leader sitting at one of four equal-length sides of a square table would inherently project a less hierarchical power, and would be open to greater influence from his council.

The myth of King Arthur and his knights is inseparable from the idea of the round table, symbolizing in literary terms what is implied by its geometry: that a circular table is as likely to promote good will as an oblong table is to promote confrontation.

In contradistinction to these examples, the President of the United States neither sits at the head of a long table nor randomly along one of its sides, but in the middle of one side, flanked by his most important cabinet members. He thus visibly occupies the position of a chief, but, as signified by the wideness of the table, and the evenly spaced seats around it, is also "one of the team."[1]

The shape and size of a table's simple plane may encourage or deter interaction. The following comparison between two volumes of space—a niche on a church facade in Venice, and a pit-like indentation in the floor of mosque in Isfahan—illustrates formal structure "in action." It is through children's interpretation of these spaces, designed for other purposes, that their formal structure becomes apparent.

The Venetian girl instinctively "saw" the niche as her little house, or perhaps a store. A combination of several architectural elements makes the found space her own. The bar screen, meant to keep grownups out, happens to be proportioned to her size so that she can safely peer out into the more dangerous world beyond, firmly grasping the two vertical bars as an adult would a door frame. In alignment with the protruding base plane of the the adjoining pilasters, the assembly of horizontal and vertical bars becomes a transparent plane. By extending into and past the niche at bar height, the top of the stone base implies a ceiling over the little house or room. Finally, the paving pattern of the piazza continued into the niche, thus negating the division between public space and the girl's private domain. Had the bar screen been installed one foot deeper into the niche, its use as exterior wall to the house would have been impossible; therefore, this found space would have had an entirely different character, inviting other spontaneous responses.

Although the example from Isfahan is less complex, the instinctive use of the found space by the six boys is similar to that of the Venetian girl. The indentation, instead of being vertical and forming a niche, is horizontal, resulting in a kind of pit. Both spaces are volumes with defining planes perpendicular to each other, but because of their different orientations, the edge or "rim" increases in importance at Isfahan: it is where the boys sit. Although they are neither quite inside nor outside the space, in formal structural terms it is similar to the threshold created by the bar screen facing the piazza at Venice.

Other specific architectural elements, when combined, make this space an almost irresistable gathering place for the boys. The proportions and dimensions of the trough, as large as an oversized bathtub, provide a safe and spacious environment. The checkerboard tile pattern follows the hollow of the pool-like space, falling from and rising toward the original floor level, as if the ground had given way to a mighty force. The overall effect blurs distictions between the inside and the outside, encouraging the boys to conceive of the "boundary" in a variety of ways. In both instances the subtle ambiguities of these places, in Venice and Isfahan, are the key to their success as found spaces.

In order to provide a more complete answer to my initial rhetorical question about why and how to undertake this study based on visual discourse, we need to shift our focus. Why am I concentrating on the Islamic architecture of Iran and Turkistan in this book? I regard this region's traditional architecture as particularly rich in its expression of indigenous architectural issues, which can provide new insight into our own architectural culture and that of others. And lastly, this architecture most convincingly demonstrates the power of formal structure.

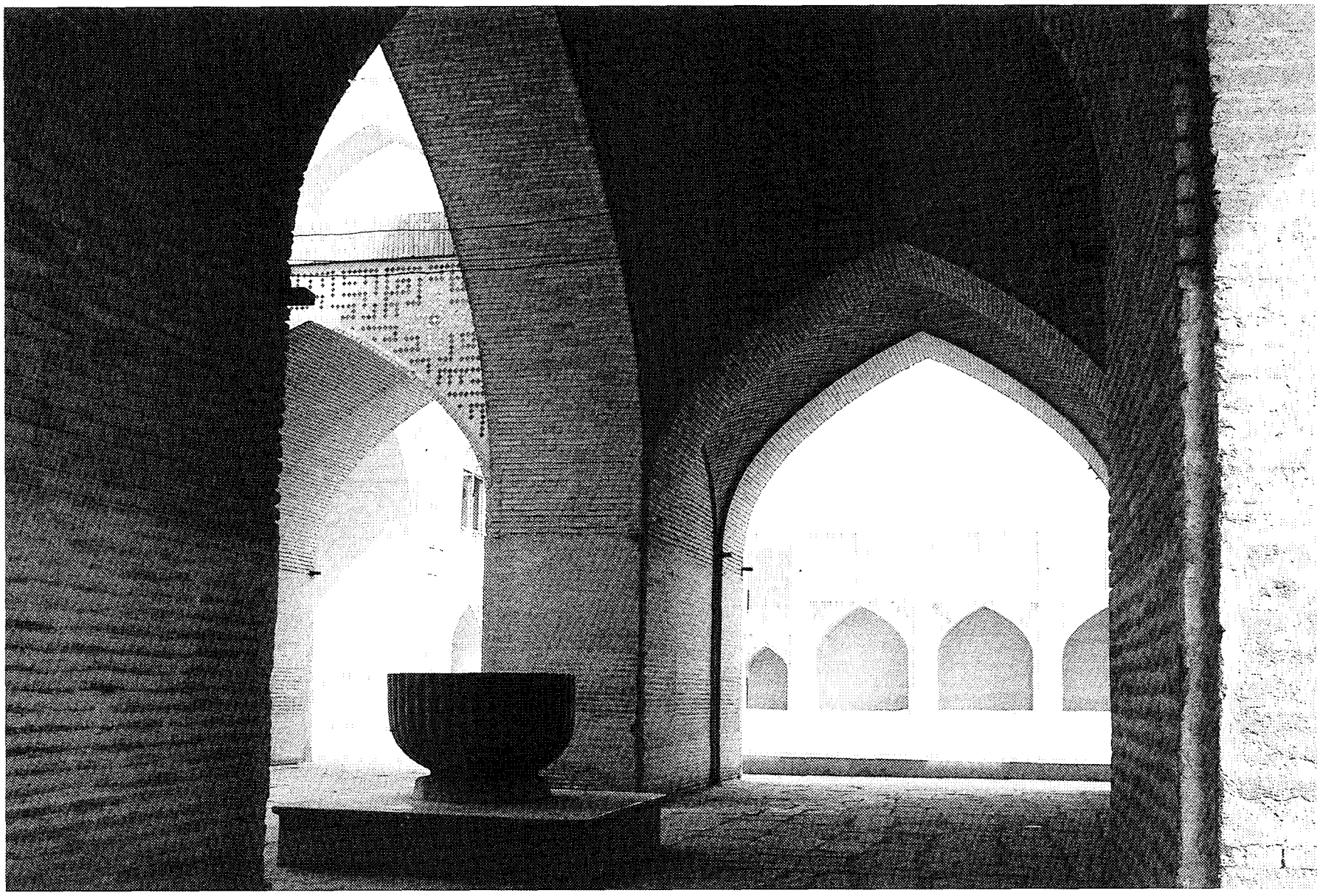
If asked to select one representative drawing to describe the aim of this study, I would choose the section-axonometric from the discussion "Bazaar: Amenity" (Page 33). I had an inkling of the place's importance as I was measuring the spaces on opposite sides of the Isfahan bazaar on a quiet Friday afternoon, the Moslem day of rest. From the raw data brought back to Columbia University in the fall of 1975 to the final decisions about which elements should be shown and how—from black for solid sections to dots for edges "ghosted in" for information or gestalt reasons—was a long road, finally completed in the summer of 1986.

If you now turn to "Aspects of Formal Structure" and its supporting drawings, diagrams, and photographs (Pages 34, 35) accompanying this spatial ensemble, and then "overlay" the discussion on found spaces in Venice and Isfahan, you can begin to fathom the reasoning behind each graphic decision. Among other considerations, multiple scenarios were imagined, as if by analogy played out by children.

I single out this particular drawing from Isfahan because it contrasts intimate and public spaces with the city fabric as a whole, a fragment of which is visible in the roofscape. Two public institutions face one another on axis across the city's commercial artery, enhancing each other's essential characteristics. When seen from the intimacy of the fountain space, the mosque and its floodlit forecourt appear even more monumental. In turn, the intimacy of the fountain space becomes more apparent when viewed from the immense mosque portal. The bazaar's order and stability, both literally and figuratively, contrast with the individual stalls, as well as the surrounding and ever changing city fabric. Lastly, the combined interaction of tectonic elements: large-scale pilasters, arches, domes, poché solids, and small-scale steps, benches, columns, pavement, and screenwork form paths of light, places of dark coolness, bustle, and rest. This drawing, as well as others, uses graphic means to make visible the invisible, such as climate, legal systems, and social customs, which are discussed in the preface.

New York, October 1989 Klaus Herdeg

[1]The table discussion is from my *Decorated Diagram* published by MIT Press in 1983



Mosque Al-Hakim, approaching the main courtyard
through one of several entry spaces

Preface

It is quite true, as Klaus Herdeg points out in his foreword, that drawings and, to a degree, photographs are a text, his text, introducing readers or "lookers" to the traditional and monumental architecture of two very distinct areas: the cities on the southern and western edges of the central Iranian wilderness and the large urban centers beyond the Oxus, on the old trade route from Iran or India to the Far East. Why is it reasonable to show these two regions together? And what sort of statement about architecture is made by these drawings?

Iran and Turkistan, or Iran and Turan, as the classical Persian epic tradition has it, were two poles of ancient Iranian culture. One, centered in the relatively protected vast oases of Isfahan, Nayin, Kashan, Shiraz, and Yazd, on the mountains overlooking Iraq, and on borderline cities like Ardistan, Zavareh, or Niriz, had been the homeland of the ancient Iranian dynasties of the Achaemenids and the Sasanians. Late in being converted to Islam, it became the center of Seljuk rule in the eleventh century. In the sixteenth century the dynasty of the Safavids, which unified the Iranian world more or less within its geographical and cultural borders of today, established its capital in that region, in Isfahan, and transformed the city into one of the jewels of Islamic and Iranian architecture and urbanism. Western and southwestern Iran, the ancient land of Fars, was also the homeland of Hafez and Sa'adi, the great lyrical poets of classical Persian literature.

Quite a different destiny befell the northeastern Iranian world, the traditional provinces of Khorasan and Transoxiana. This was the extreme limit of Alexander's fantastic journey, and seemed then at the end of the known world. For a long time its most lively culture was Buddhist, but all other religions and sects are represented in the tumultous centuries preceding the arrival of the Arabs and of Islam early in the eighth century. Until the ethnic and cultural (but not necessarily political) stabilization under Uzbek rule in the sixteenth century, it was an area of constant movements of people, goods, and ideas. Brutal Mongol invaders and more peaceful Turkic tribes went through on their way to other places. Locally bred or imported dynasties succeeded each other in an order so confusing that it is often impossible to remember who was ruling which city at what time. New capitals were created, like Ghazni or Shahr-i Sabz, but ancient cities like Samarkand or Herat were constantly built and rebuilt. It is there that the Persian epic tradition acquired its masterpiece when Firdawsi completed the *Book of Kings,* but it was also, at least until the sixteenth century, an area of international scientific and cultural achievements by scholars from all origins. Vibrant and inventive, creative, and subject to all sorts of influences, it was an outpost in inner Asia of western Asian cultures, the space of passage of pan-Asian phenomena like Buddhism or silk, and occasionally, as in the brilliant fifteenth century of the Timurids, a major political and artistic center.

The monuments shown in this book come, for the most part, from the fifteenth century in Turan and from the early seventeenth in western Iran. These were the centuries when a truly Iranian synthesis was achieved out of a most diverse range of motifs and means of construction and planning. The imperial rules of first the Timurids and then the Safavids provided a patronage which in effect formulated the classical pre-modern ways of official Iranian architecture: competing contrasts between surfaces and volumes, brilliant colors in many techniques of execution, double axes of composition based simultaneously on the center of the building and on its entrance, *iwan,* and dome as dominant terms for designing nearly anything, cascading muqarnas entrances and vaults, stunning differences between the skin of buildings and their bone structure.

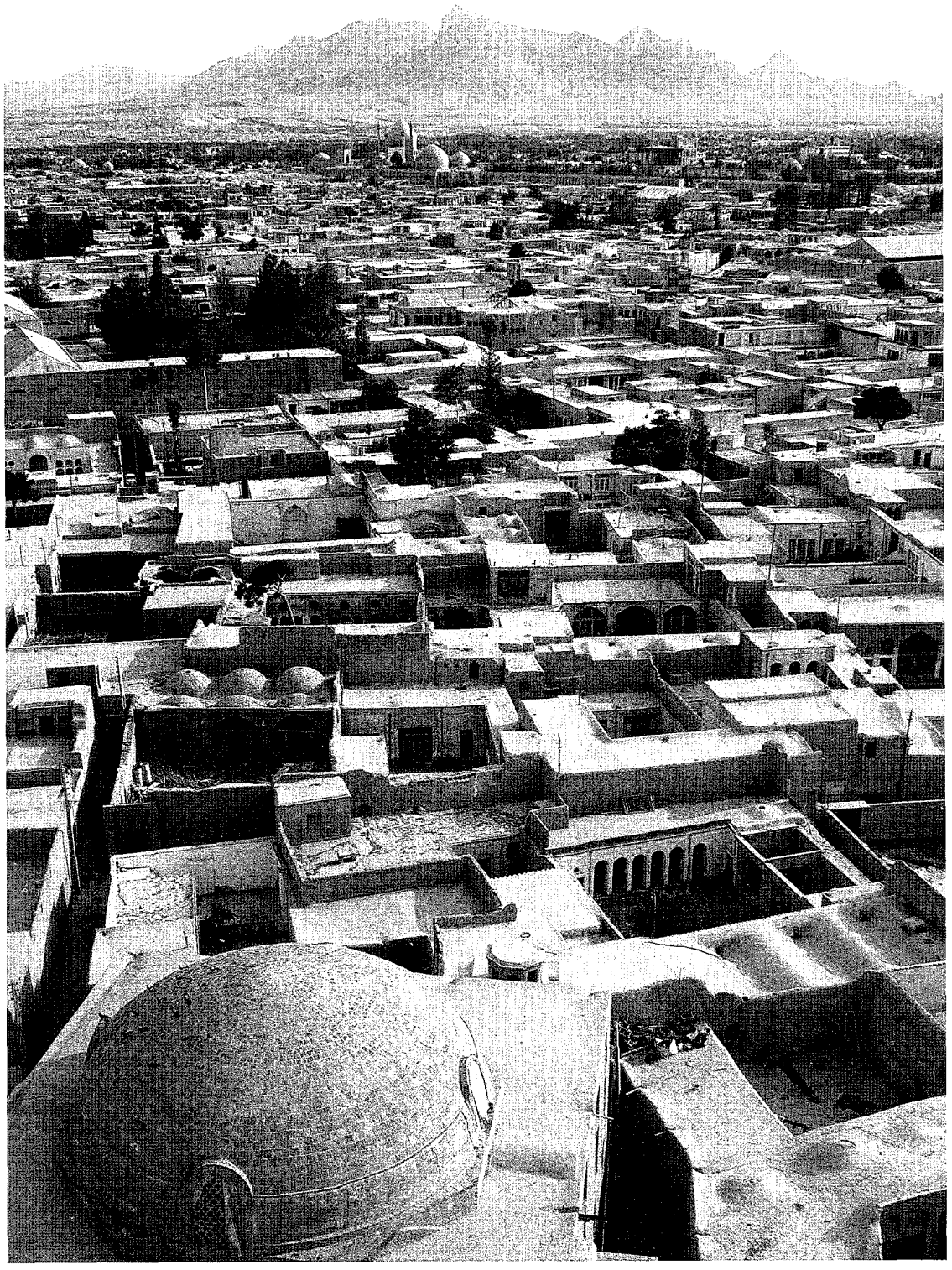
Much can and needs to be said about the architectonic values of these buildings, about their evolution over the centuries, about their function and meanings within their own time, and then about their significance today to those who live with them, who still partake of their presence, and to those who are away, both physically remote and culturally different from the patrons and users, past and present, of these spaces. What can all these readers see in the documents gathered by Klaus Herdeg? What can they "read" in them? The primary value of these drawings and pictures does not lie in the specific information they provide about buildings that are for the most part well-known, like the Royal Square of Isfahan and its attendant masterpieces. It lies rather in the choices of interpretation suggested or implied by the drawings and the often unexpected sections and axonometric views. Several drawings with different emphases of the same monument, cuts through buildings that suddenly emphasize one section over others, visions that are only available to birds or to angels, these are exciting ways of looking; they all illuminate a monument or compel a focus not normally available or expected. And they are all true, as they are all reflections of the reality of the buildings with which they deal.

This is precisely where these drawings raise fundamental questions of architectural perception. If they are all true but so different, are they really reflections of a building and of an ensemble? Or are they, perhaps, the choices of a contemporary artist-architect who demonstrates his enthusiasm and depth of feeling for buildings but not necessarily the truth of something put together many centuries ago? The question is not simply a pedantic one of figuring out whether the past has been properly understood and whether a new and artificial image is faithful to that past. For in reality our whole perception of architecture is involved. However complex a given axonometric drawing, it, like any photograph, is a two-dimensional image on a page. But, whereas a photograph, however doctored, is ultimately true to an instant of the reality of a building, a drawing never represents something seen at the monument. It is a choice and, like all choices, it eliminates something in order to make something else clearer. The fascination of Herdeg's drawings is that he acknowledges the partiality of drawings by offering several possibilities without choosing between them. A cop out perhaps, but in reality it acknowledges that no one has the right to impose a single view of buildings, and that a major work of architecture (perhaps any work of architecture) is too rich a creation to be shown in one way only.

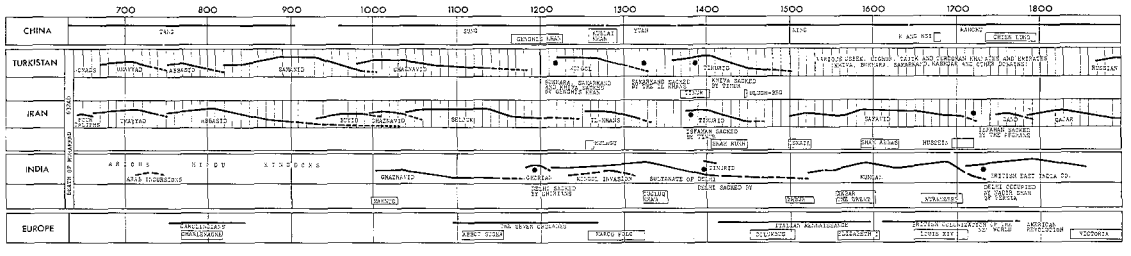
The lesson here is a philosophical and perceptual one. We know too little about the ways in which the brain, trained or not, rebuilds the segments of truth given to it by drawings and photographs. And, ultimately, what is at issue is the nature of the truth of a building, of a monument, an ethical dimension rarely raised by critics or historians. One of the numerous and exciting aspects of the images gathered and drawn by Klaus Herdeg is that they compel raising deep questions about architecture in general, not only about its representation. And it is the glory of classical Iranian architecture that its clarity and its compactness allow for the raising of profound questions about the art of building and the way we see it.

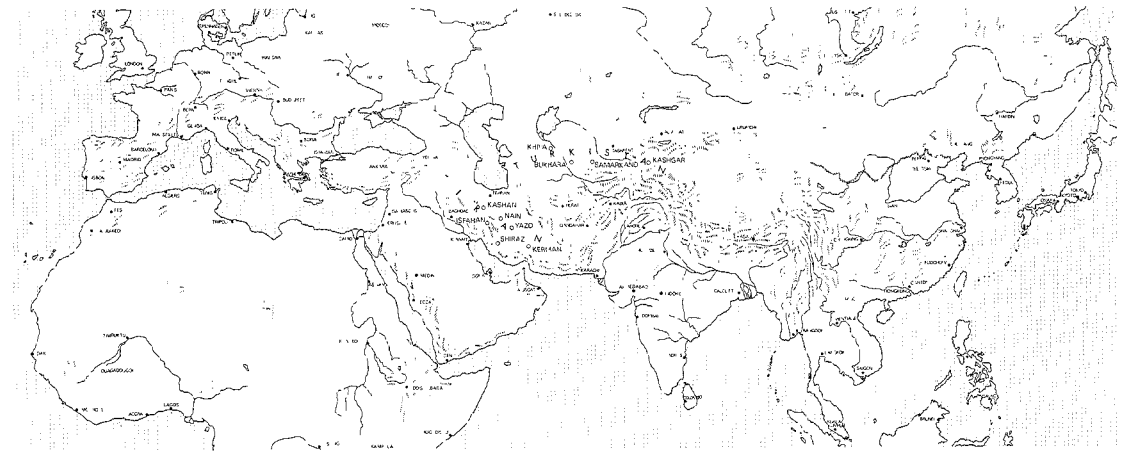
Cambridge, October 1989

Oleg Grabar
Aga Khan Professor of Islamic Art
Harvard University



Isfahan Spread Out Like a Carpet Looking south towards the Maidan-I-Shah and the mountains beyond





Introduction

This publication and the exhibition associated with it propose to explore public and private buildings of Islamic cities in a geographically and historically interrelated region—Iran and Turkistan. It also examines the urban fabric, itself an all-encompassing "building," giving visible expression to the Islamic concept of *umma,* or oneness of all. According to *umma,* the individual and the community are inextricably interdependent.

The principal purpose is to illustrate and explicate selected formal structures, rather than to give a traditional historical account.

The eye of the viewer being principally addressed, the term formal structure as used here calls for definition. Formal structure is the underlying order and its effects on any natural or man-made object or phenomenon based on inherent formal properties such as symmetry (axiality), hierarchy (progression), climax, repetition, and others, to which may be ascribed analogous functional and symbolic attributes and values. While formal properties are fixed through time and different cultural conditions, values are not. In other words, the term couples definitive formal givens with their latent interpretations and transformations realized through human instinct, imagination, knowledge, and ingenuity, which, in turn, are often governed by tradition, time, and place. However, no interpretation or value judgment is possible without first "recognizing," that is, seeing, inherent formal properties and their interplay and effect on each other.

A spectrum of cities and city components is displayed to allow a comparison in size and purpose, past and present. An imperial capital is thus contrasted with a provincial city. A public building in Iran is set against its counterpart in Turkistan.

The geographic area encompasses the Iranian central plateau and, to the northeast, Turkistan in central Asia. Turkistan spreads from the Caspian Sea through Soviet Uzbekistan over the Pamir Mountains into the Takla Makan Desert in Sinkiang Province in China. The chain of cities formed by Kashan, Nayin, Isfahan, Yazd, and Kerman, with Shiraz to the south, represents a wide range of urban settings of varying prominence and raison d'être. The same is true of a parallel chain in Turkistan: Khiva, Bukhara, Samarkand, and Kashgar.

The first half of the publication and exhibition covers Iran (16th c.–19th c.), the second half Turkistan (12th c.–19th c.). The two rulers commonly associated with these areas are Shah Abbas I (1587–1629) and Tamerlane (1336–1405), respectively. Because of its non-chronological objective and format, the earlier and later examples mingle freely, emphasizing the stability of certain formal structures and shedding light on the astonishing continuity with which life and architecture imbue these cities and buildings.

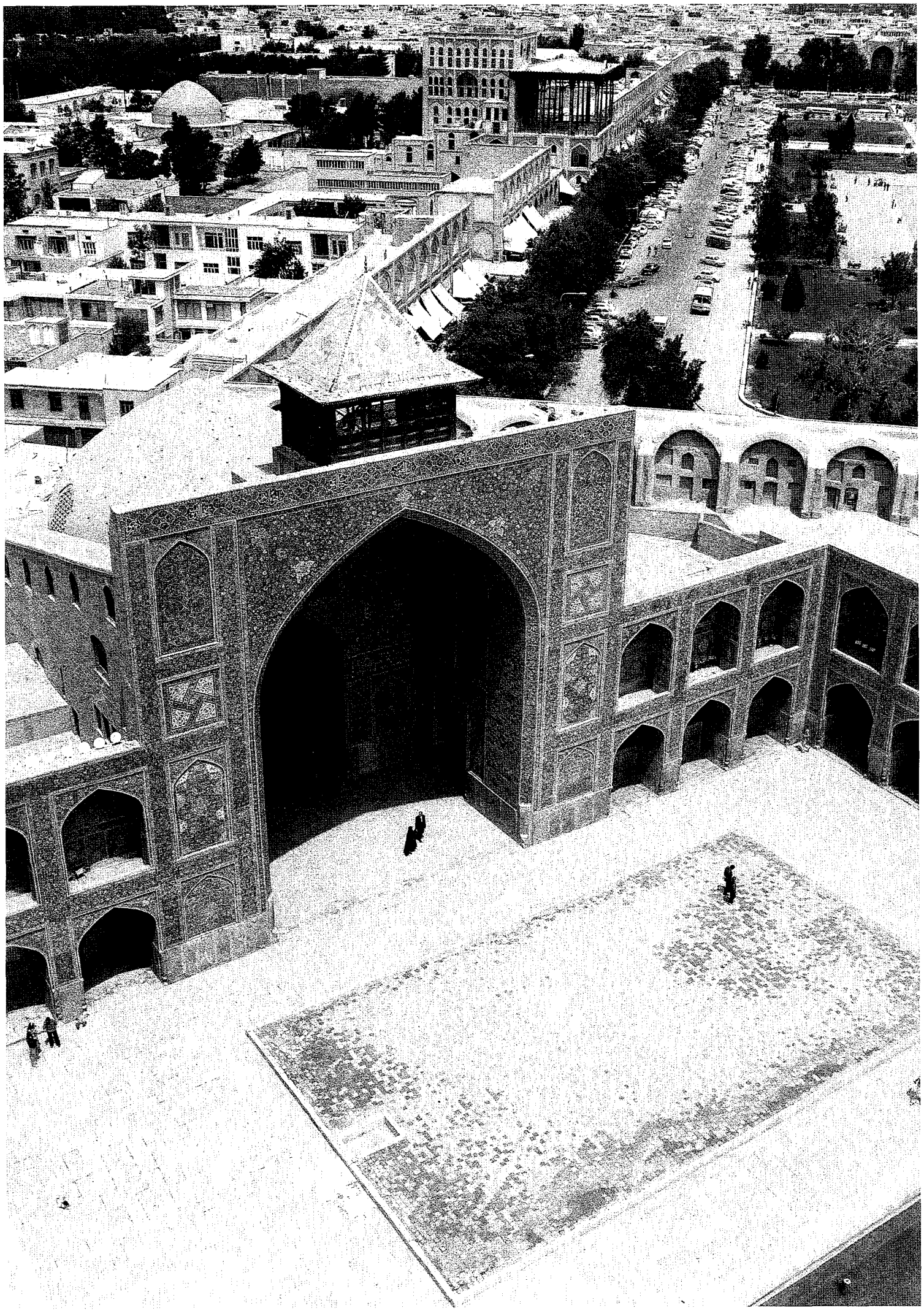
The construction process is perpetual as the use of buildings is always adjusted to new conditions. Cities and buildings get built with a specific program and civic purpose in mind; they may be demolished and restored; their original assignments may change, and still, as long as their fundamental formal structures are recognized, they live on.

Whether understood historically as artifacts or as "found objects," there is a hierarchy of urban spatial components governed by the same planning and design principles. Court and street are paramount formal and functional elements on all levels of consideration. For instance, the rooms in a house may be separated by corridors as the clusters of houses and other buildings in a neighborhood are divided by narrow streets and alleys. Looking at the city in its entirety, one often finds a continuous bazaar/corridor winding its way between all courts, large and small, important and less important.

A standard Western definition of urban form cannot be applied to the Islamic cities of Iran and Turkistan. This is because the spatial elements are forever repetitive, though varying in degrees of relative anonymity and monumentality, and because the city is an uninterrupted fabric of all kinds of buildings and places. While the elements are hierarchical in themselves, the city as a whole presents an image of collective disarray—itself another order. One layer of this order is the pious institution of *Waqf,* which plays a major role in the formation of the Islamic city. A *Waqf* is a permanent endowment in the form of land or other immovable property—like bazaar stalls, caravansarais, and public baths—whose income is used for "good" purposes compatible with Islam; for example, maintenance of buildings such as mosques, madrasas, hospitals, and fountains.

The formal structures presented here permit different interpretations of form as well as content. They also show something about the making of architecture—past, present, and future. For these reasons, this work is conceived as a kaleidoscopic view.

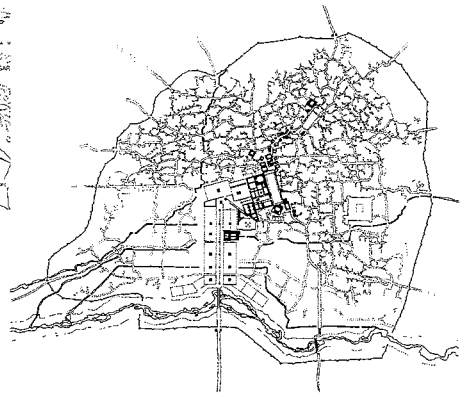
New York City, January 1987 Klaus Herdeg

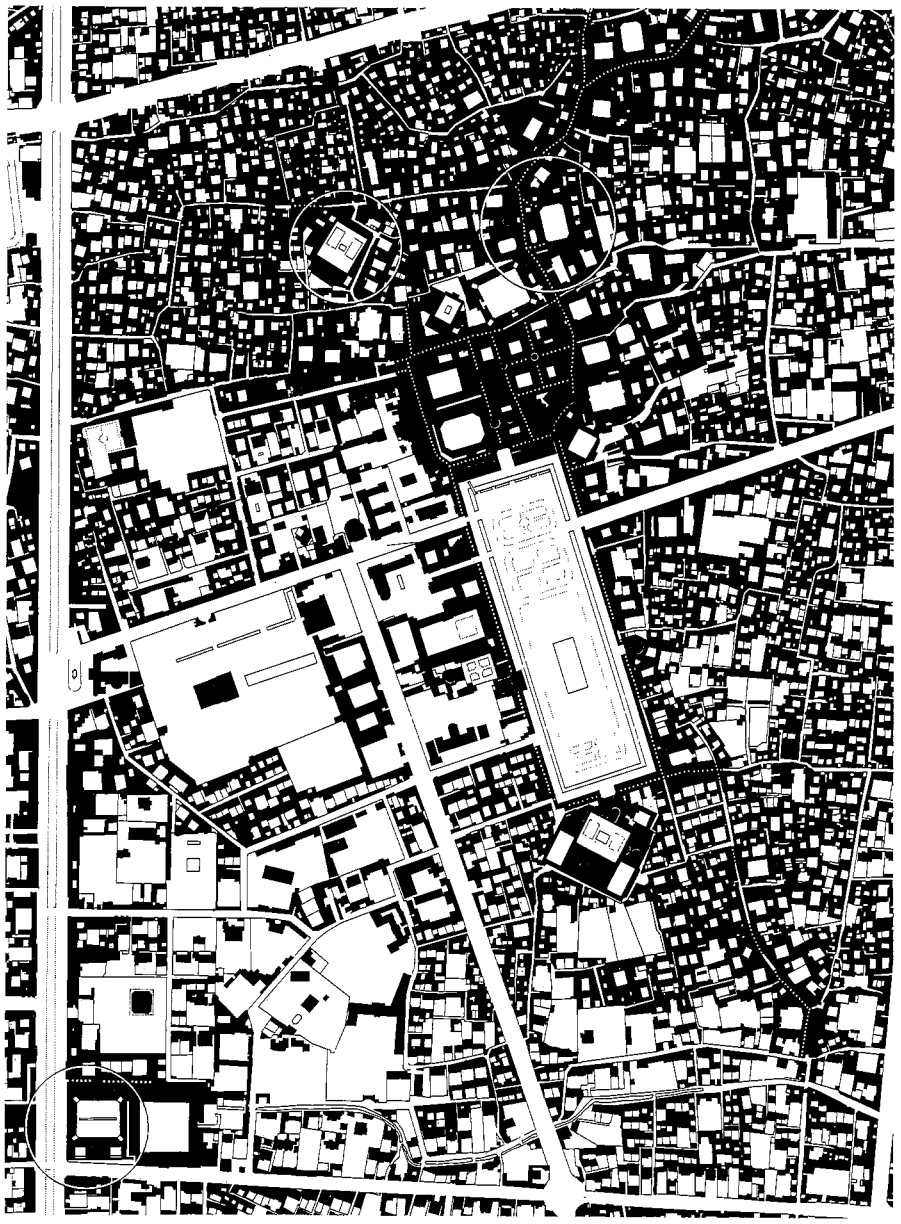


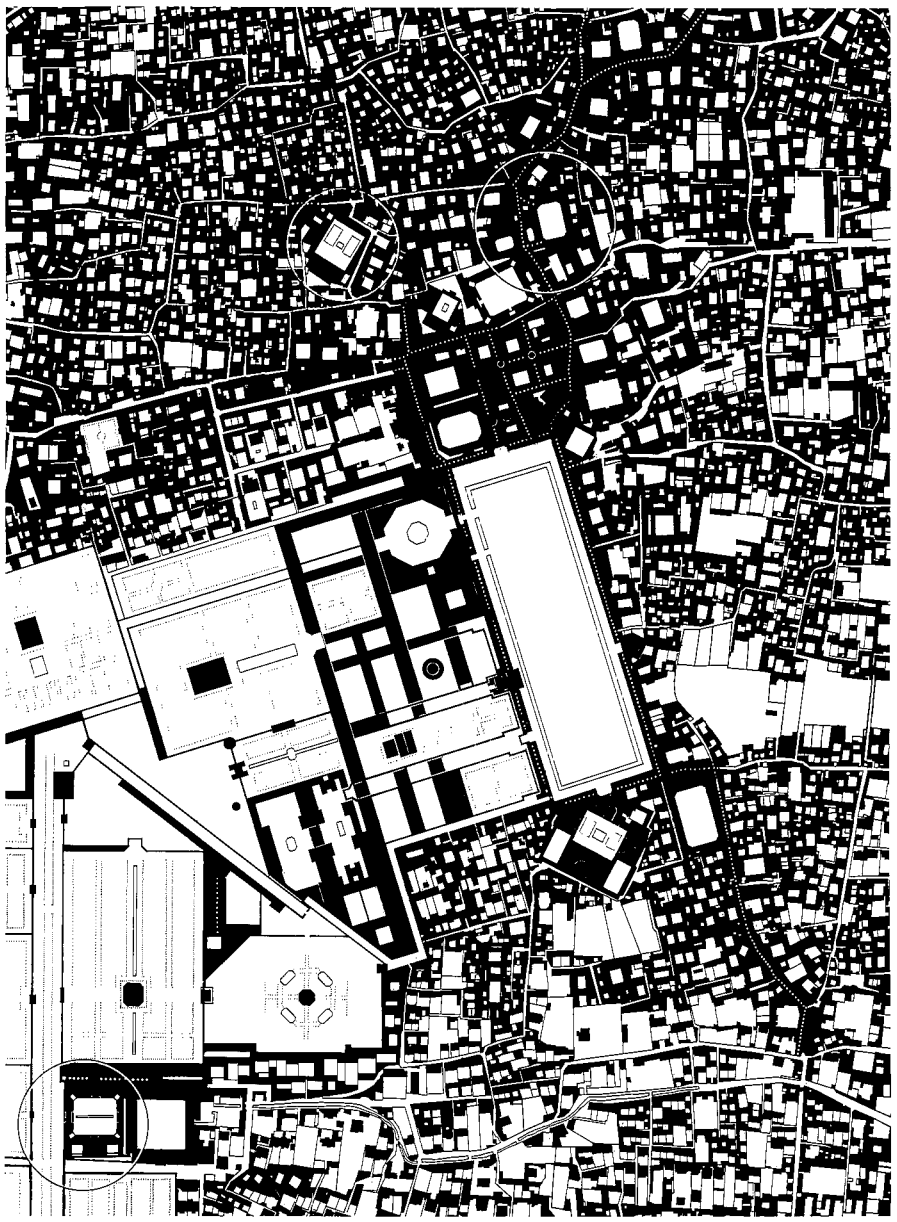
Isfahan, Maidan-I-Shah, looking from one of the minarets northward across the central court of the Shah Mosque along the Maidan and past the imperial porch (Ali Qapu) into the city fabric

ISFAHAN

IRAN



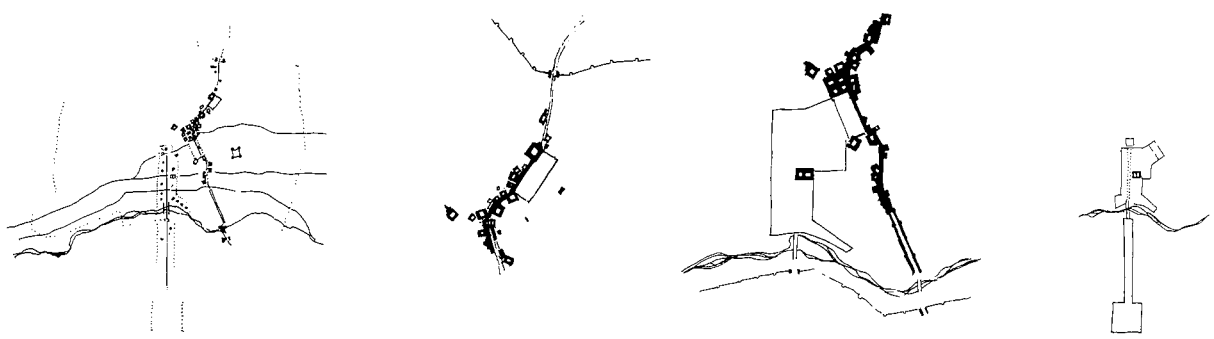




Site plan of the Maidan-I-Shah, and surrounding public buildings, as they exist today (left) and a hypothetical reconstruction of the same area in the 17th century

Isfahan became the capital of Iran in 1587, following Tabriz and Qua'zin Isfahan is the scene of a counterplay between incremental growth and conscious planning The city grew by accretion over the centuries When Shah Abbas I (1587–1629) came to power, he introduced grand scale planning by building Maidan-I-Shah as a spectacular display of his power

Years before, probably under Shah Ismail (1502–54), the Maidan was moved from its previous location near the Friday Mosque to its present location as an expression of the physical and symbolic separation between the clergy and the ruler The "new" Maidan was located tangentially to the old trade route which ran from the north gate of the city to the river Under Shah Abbas I (1587–1629) many new buildings were added to the Maidan complex, including a government complex The Chahar Bagh (a major avenue similar in stature to the Champs Elysees) was planned formally leading from the Maidan area to the river and ultimately to the grand royal garden at the foot of the mountains

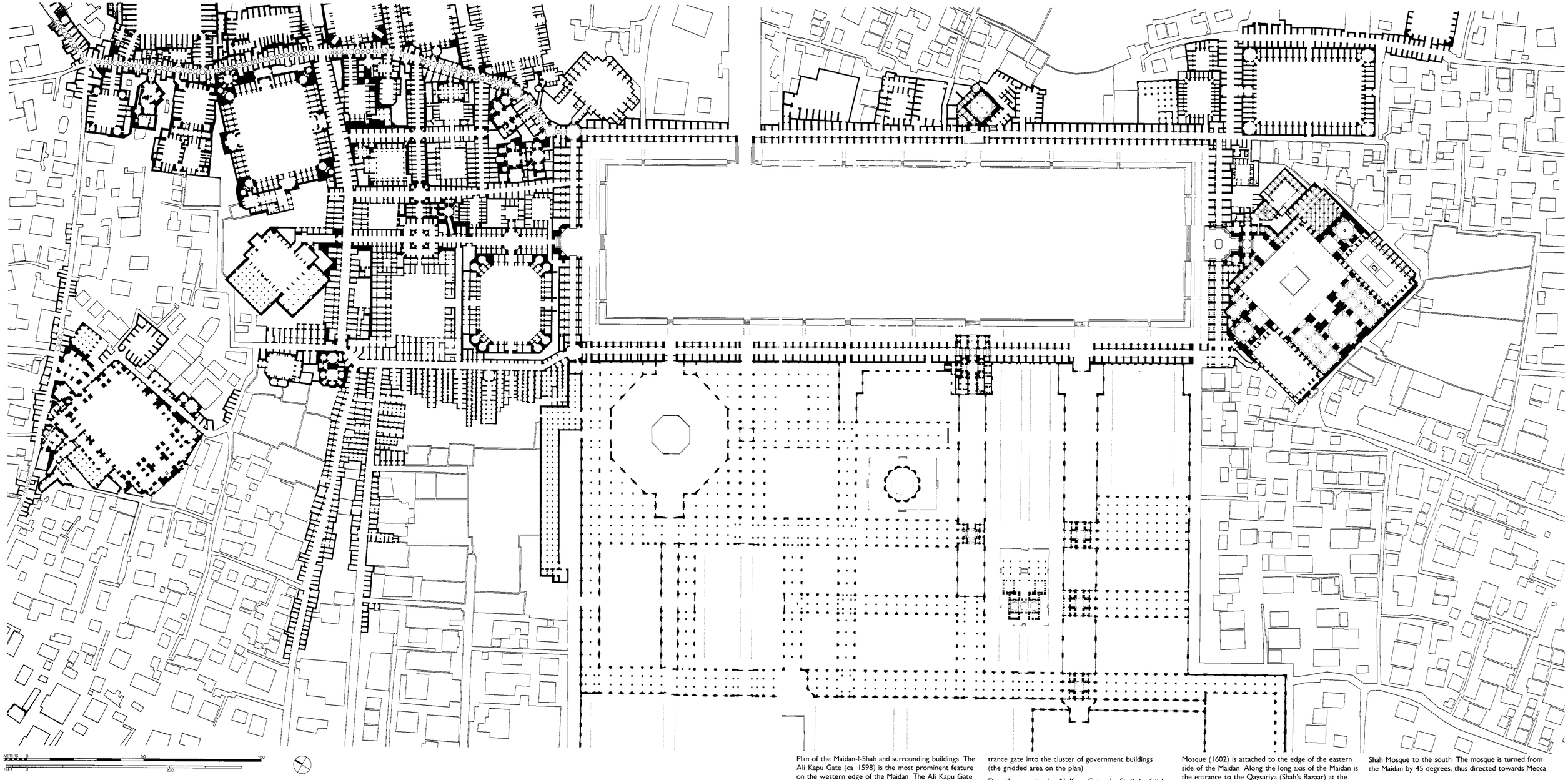


ASPECTS OF FORMAL STRUCTURE:

FROM LEFT TO RIGHT: First, the city as a whole, with the ancient trade route leading from the north gate through the bazaar and over the river, contrasted with the formal gardens along Chahar Bagh, ending in the Great Royal Gardens Second, the relationship between the old Maidan and the beginning of the bazaar Third, expansion of the city by an act of will by "latching" the royal district, (a new Friday Mosque—the Shah Mosque—and the Shah's Bazaar) onto the old trade route Fourth, the conceptual expansion of the previous "move" to incorporate it into the Avenue of Gardens Accretion and intervention are the hallmark of Isfahan planning

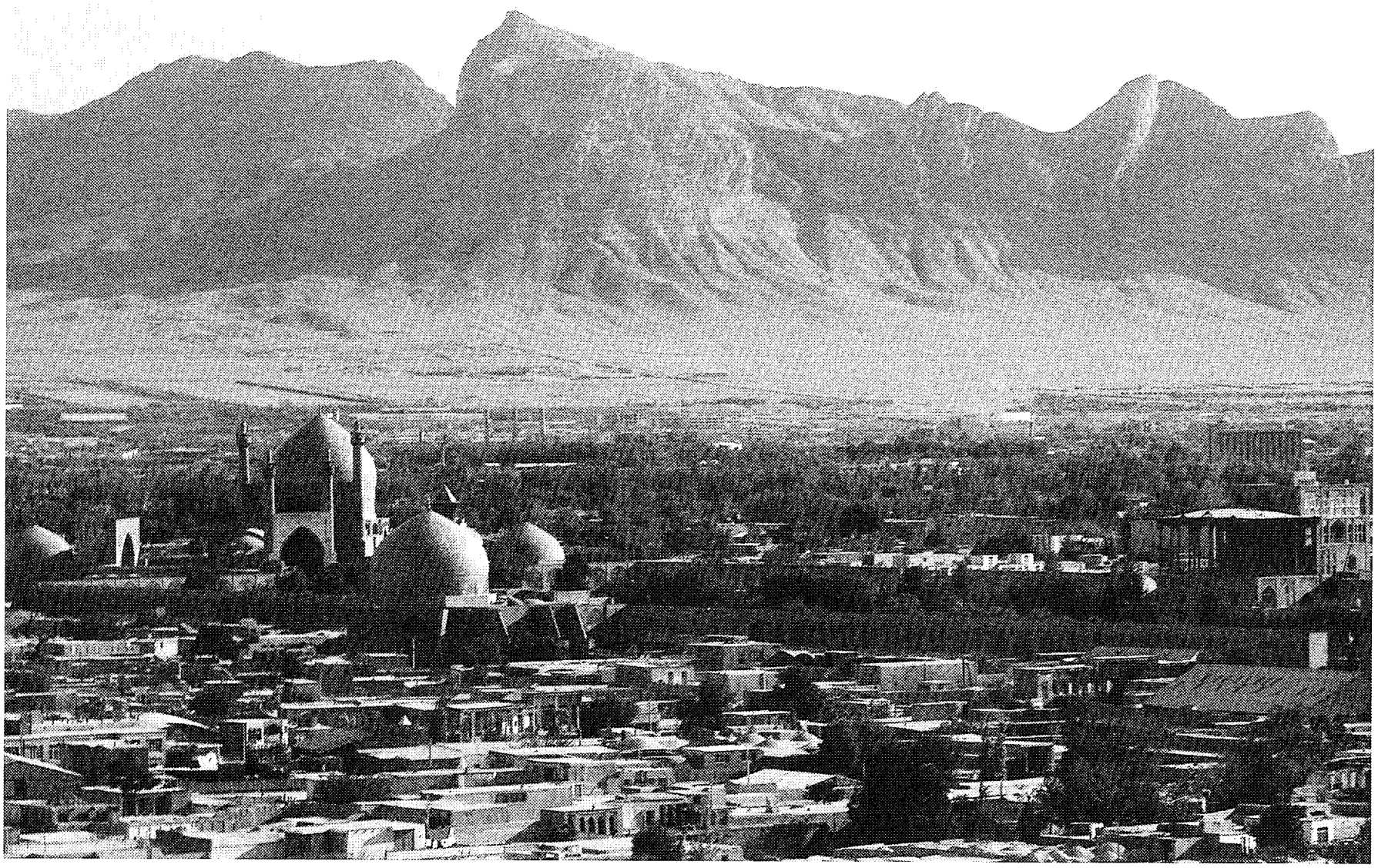
MAIDAN-I-SHAH

ISFAHAN



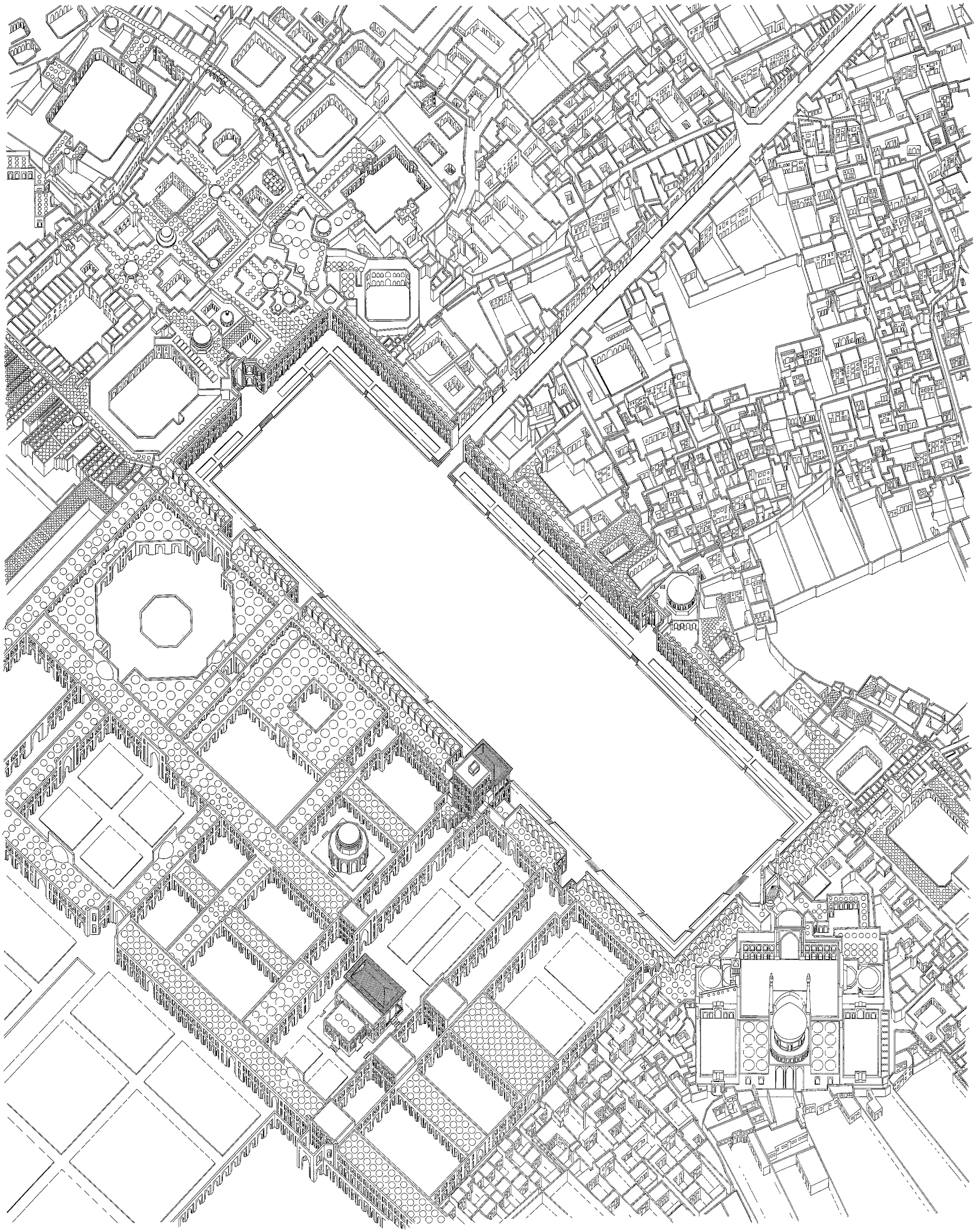
Plan of the Maidan-I-Shah and surrounding buildings The Ali Kapu Gate (ca 1598) is the most prominent feature on the western edge of the Maidan The Ali Kapu Gate served as a viewing stand, an open porch, and the entrance gate into the cluster of government buildings (the gridded area on the plan)

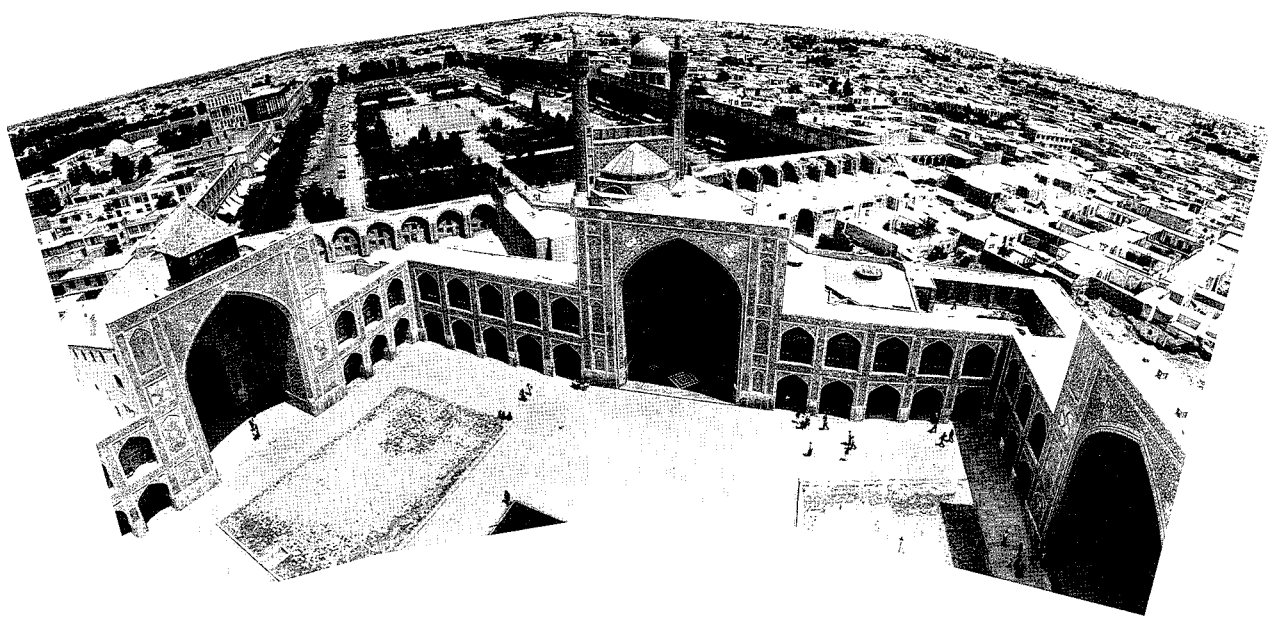
Directly opposite the Ali Kapu Gate, the Sheik Lutfullah Mosque (1602) is attached to the edge of the eastern side of the Maidan Along the long axis of the Maidan is the entrance to the Qaysariya (Shah's Bazaar) at the northern edge; it is on axis with the entrance of the Shah Mosque to the south The mosque is turned from the Maidan by 45 degrees, thus directed towards Mecca



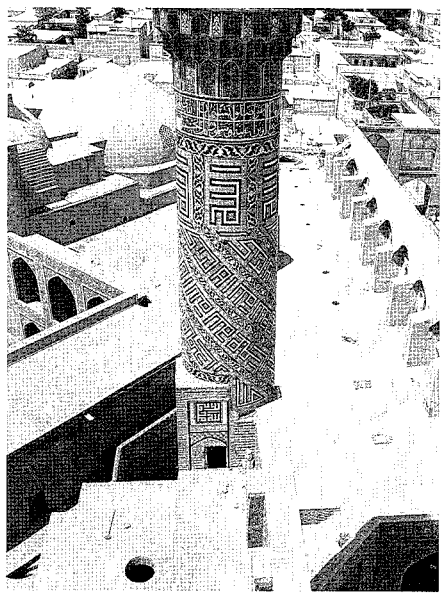
Isfahan, looking toward the southwest across the city with the Maidan-I-Shah embedded within its texture Three principal monuments are attached to the Maidan's walls: The Shah Mosque at the southern end of the confined space; Sheikh Lutfullah's tomb to the eastern perimeter; and, directly facing it to the west, the Ali Qapu Palace

Axonometric reconstruction of the Maidan and the surrounding buildings (government and royal district mainly after Kaempfer, 1712) This drawing does what only a drawing can do: It combines different states of existence into one perception—showing a palace long burned down, fields still farmed in the 1930s, a traffic artery sliced through in the 1940s, and the rest as it has been since the 17th century, and still is The point is to demonstrate the organizational strength of a built open space on an urban scale (510 ft × 1785 ft) The walls of the Maidan have a strong identity Anything could happen outside these walls, but the city would always have the same center New York's Central Park is an illustration of the same principle in a Western context, and on a larger scale

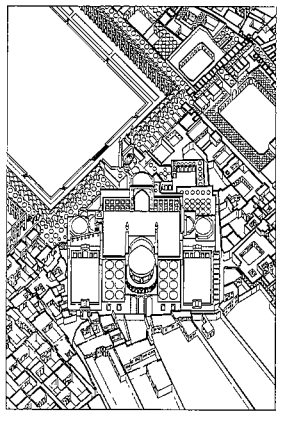


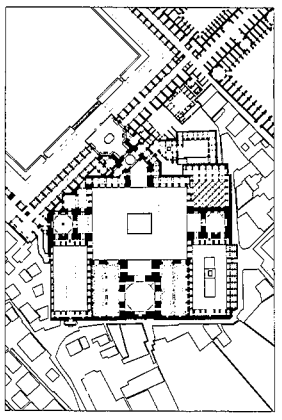


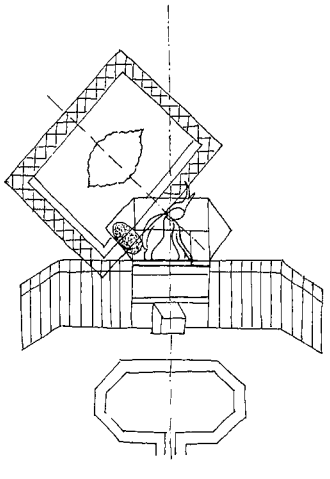
ABOVE: Central Court of the Shah Mosque, with Maidan and city beyond, looking northeast at Prayer Porch (*iwan*) The two side porches mark entries into the two domed, chapel-like spaces The axial organization of the Shah Mosque courtyard works according to the relationships found in the Maidan on a larger scale

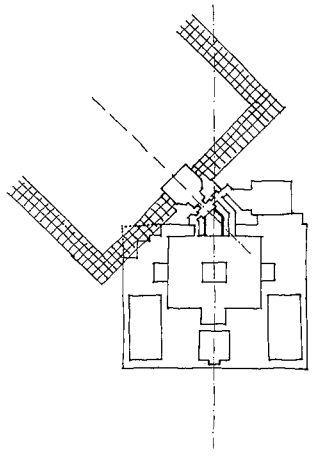


ABOVE: The western minaret of the entrance porch (*iwan*)

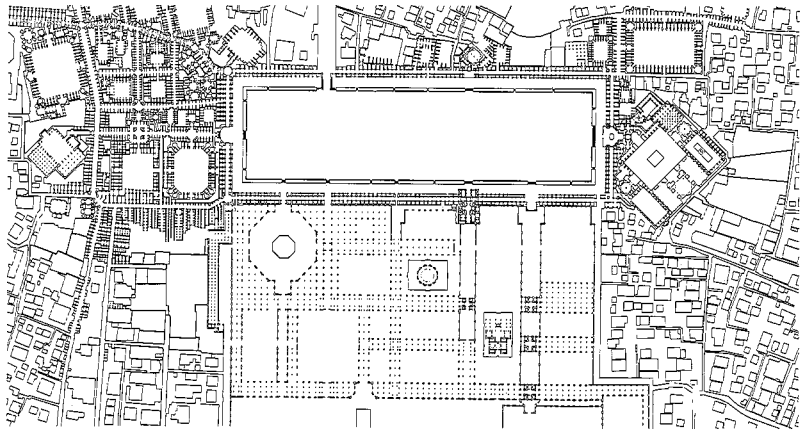


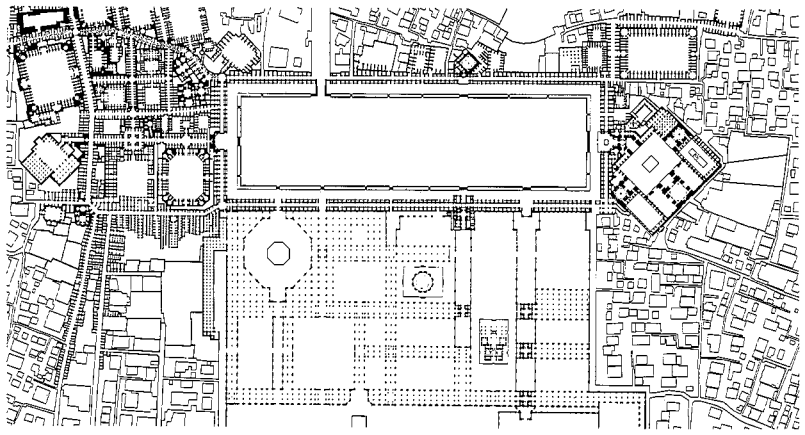


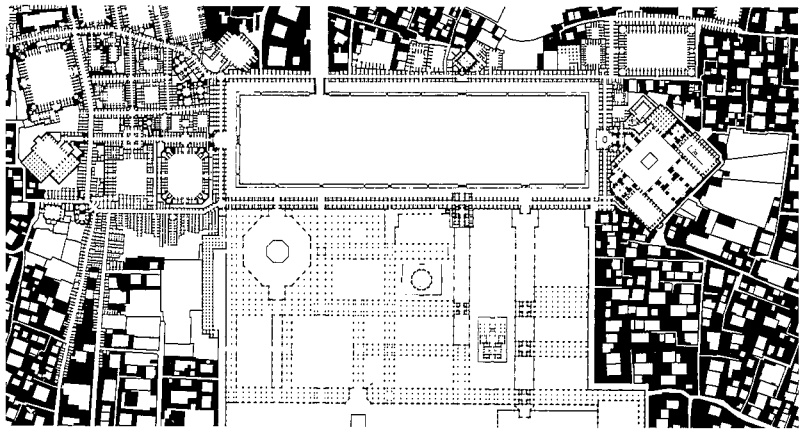


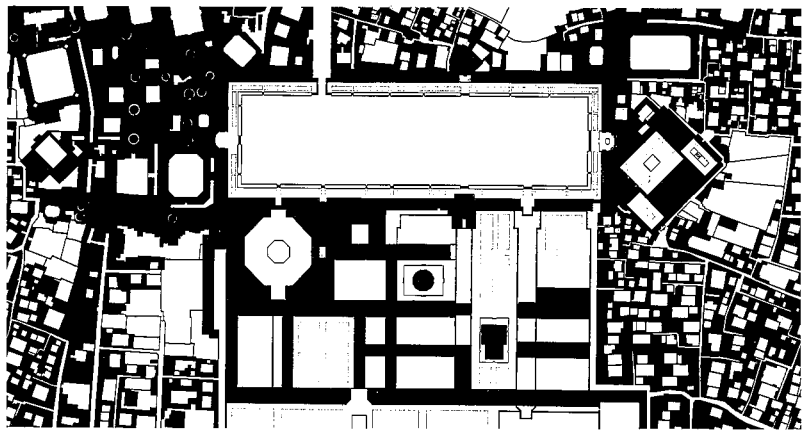


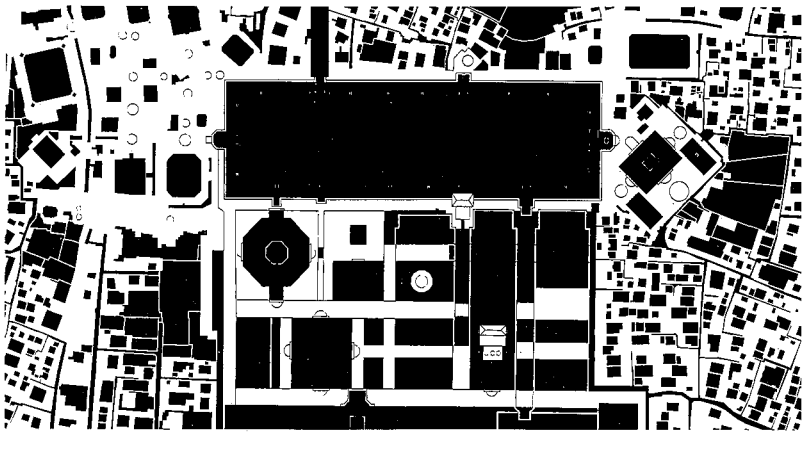
ASPECTS OF FORMAL STRUCTURE:
Shah Mosque with Maidan and Persian miniature, both Safavid period, 17th century There is a possible exchange of similar formal structures between an architectural ensemble (Maidan/Shah Mosque in Isfahan, 1597–1630) and a painting composition (Persian miniature, 1520s) The comparison is compelling in that it suggests a similar mind-set for two different forms of art, resulting in an interplay between two-dimensional surface and three-dimensional mass and volume The illusionistic possibilities are obvious, not only in this example but in much Iranian and Turkistani architecture



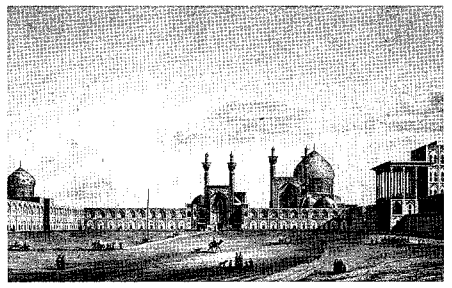




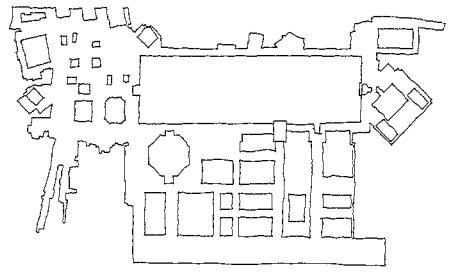




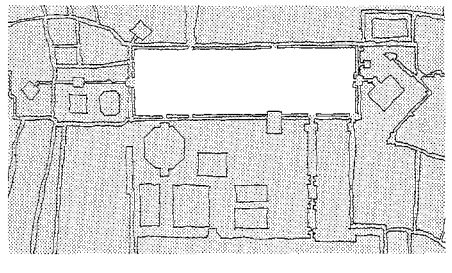
LEFT: Different perceptions of the Maidan by people of various positions: royalty, clergy, civil servants, citizens, and visitors The meaning of the Maidan varies according to one's life in the city

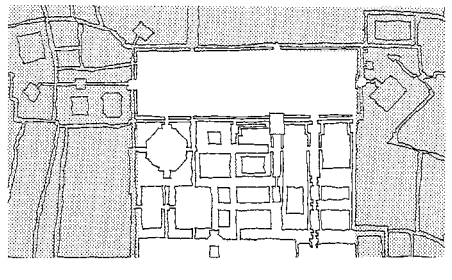


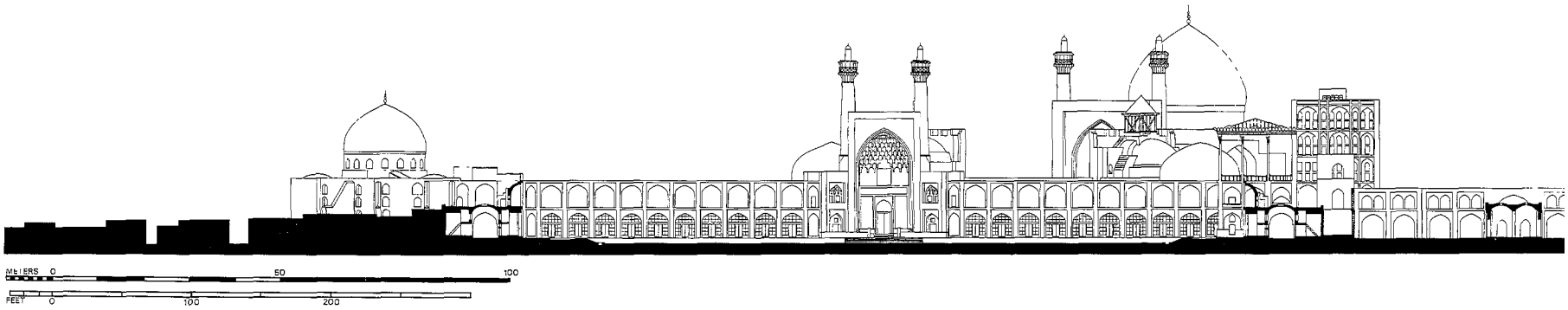
RIGHT: Maidan (above) looking south, in 1840 (from Coste) Maidan (below) looking north towards the bazaar, in the 18th century (from Le Bruyn) These views show the confined public space when it is empty and when it is filled The use of the Maidan varied from polo games to accommodation of entire caravans

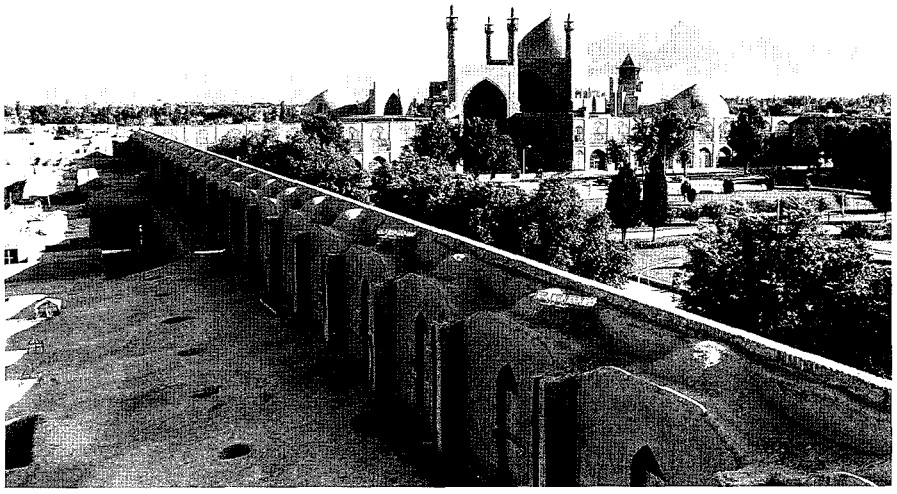


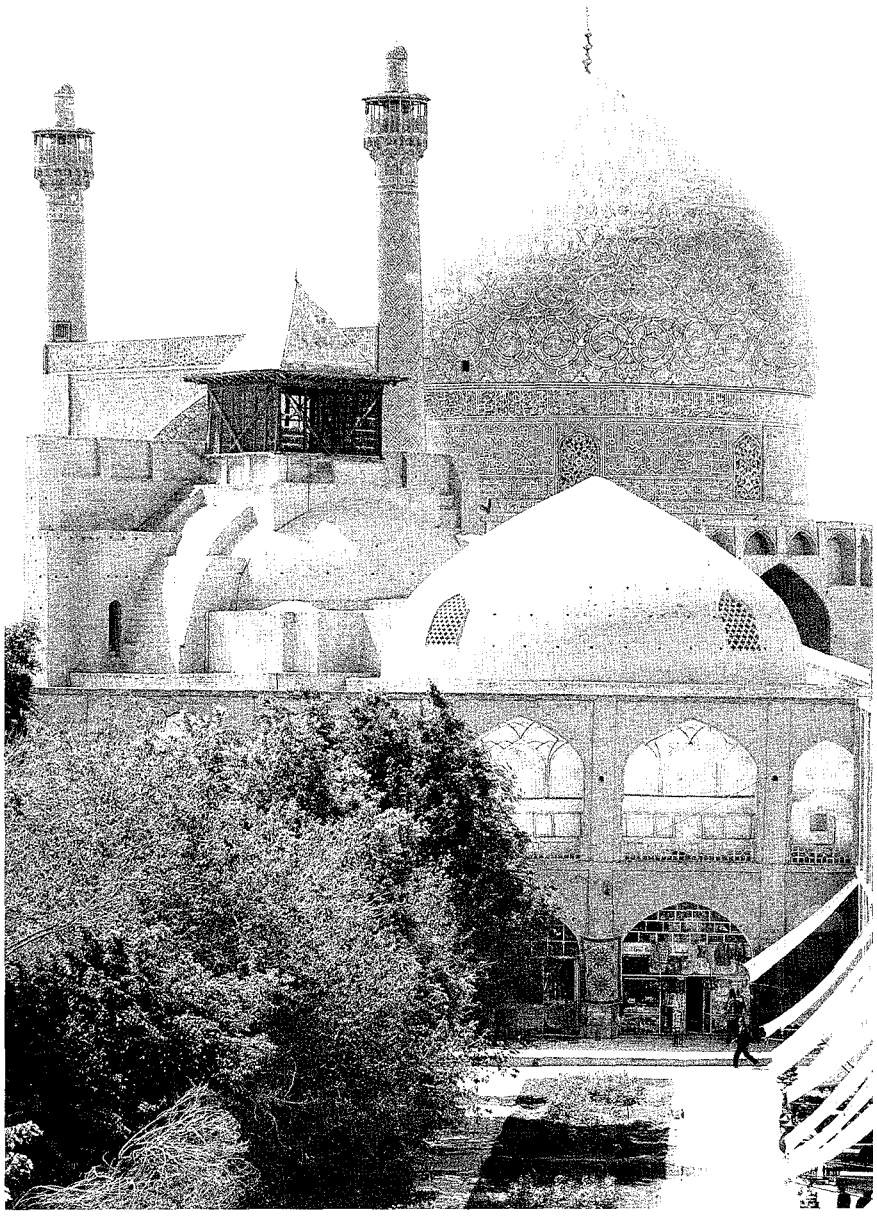
ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: First, public buildings impinging on the Maidan as experienced by a government offical Second, the Maidan as the focal space of the entire city as experienced by all (*umma*) Third, the Maidan as forecourt to the royal precinct as experienced by the nobility and citizens having business with the government

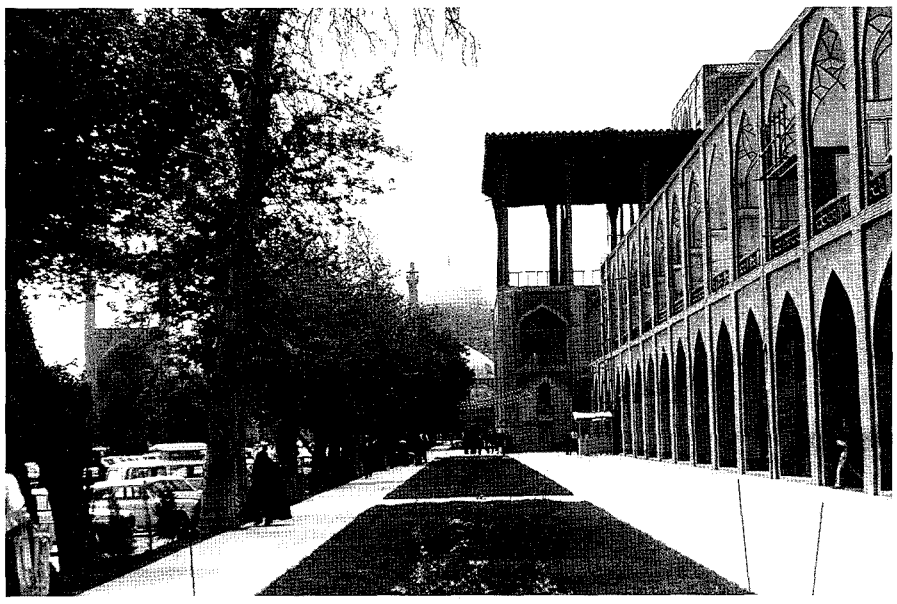












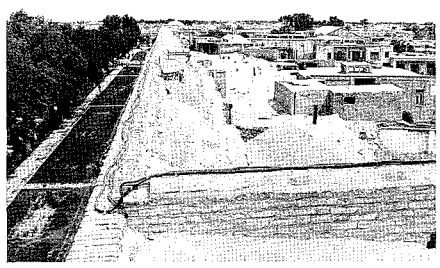
TOP LEFT: The Maidan with the Shah Mosque in the evening In this light, the thin screen wall which defines the container is revealed The profile of the mountains beyond is reflected in the agitated skyline of domes, *iwans* (monumental entry, porch, niche, etc), and minarets

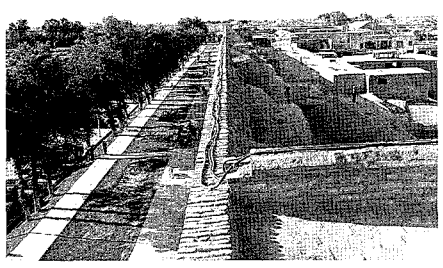
ABOVE: The public view of the Shah Mosque from pedestrian level on the Maidan looking south past the Ali Kapu gate East-west section of the Maidan and its adjacent bazaars, looking at the Shah Mosque

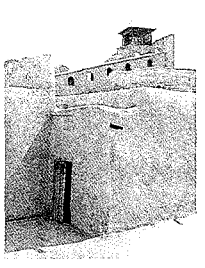
ABOVE: The privileged view of the Shah Mosque from the Ali Kapu porch looking south An impression of repose is reinforced through the axial stability of the domes The datum of the screen wall sets a visual base for the volumes of the domes rising behind it

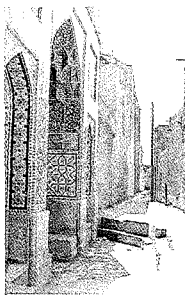
BELOW: The Maidan at 6:00 A M (left) As the morning light washes over all surfaces, the city fabric and the Maidan cannot be distinguished from one another This is in contrast to the same view at 5:00 P M when the afternoon shadow is held in the container—the Maidan—making a plastic distinction between city fabric and open space The experience is affected by temporal conditions, from time of day to time of year

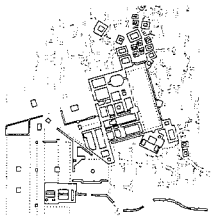
BELOW: Approach through the narrow streets of the city fabric to a minor entrance of the Shah Mosque's western courtyard When "weaving" through the fabric, even a building as large as the Shah Mosque is experienced as part of the fabric Just like the corridors of a house lead to a room, the streets of the city fabric lead to the public courtyard





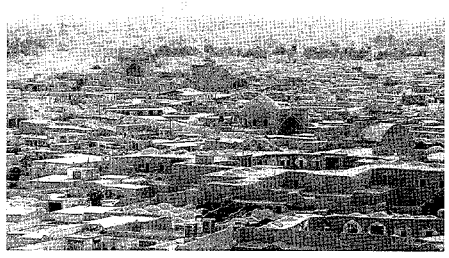




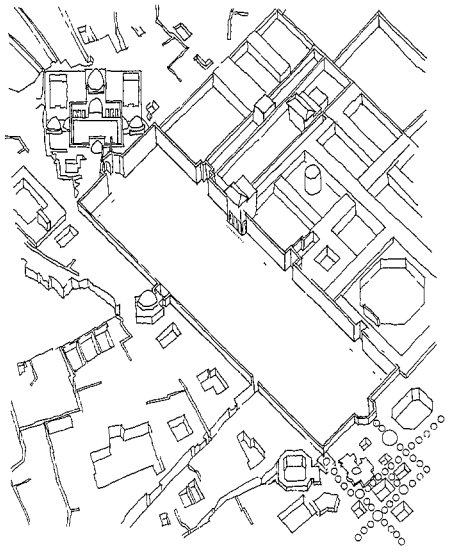


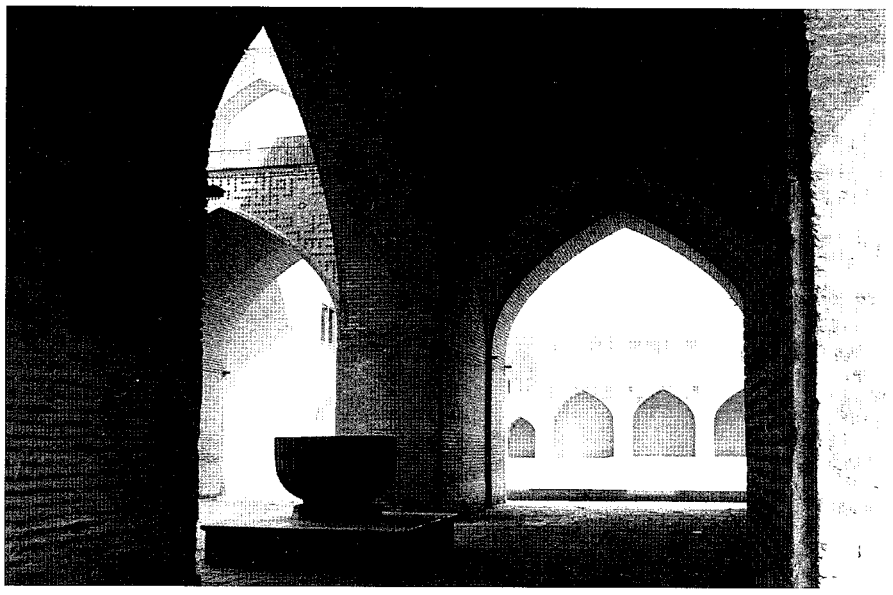
MOSQUE AL-HAKIM

ISFAHAN



ABOVE: Mosque Al-Hakim embedded in the city fabric

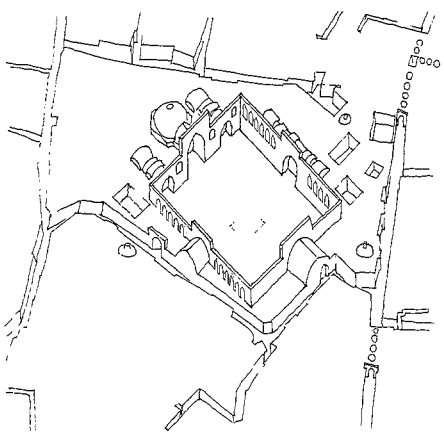


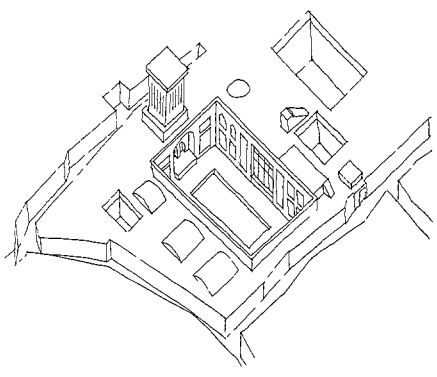


ABOVE: Approaching the main courtyard from the northwest

Mosque Al-Hakim, located near the bazaar, was built in 1654 during the reign of Shah Abbas II (1648–66) by Doctor (Hakim) Daud, who fled from Isfahan to India After making his fortune there under the grand Moghuls, Hakim Daud financed this mosque in Isfahan in his name

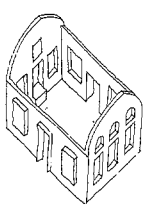
A mosque is not only a house of worship, but also a public building serving a multiplicity of uses It is a gathering place for prayers five times a day, an Islamic college, a community center for functions with present day Western associations, and an emergency shelter for travelers A mosque contains amenities, such as wash rooms and toilets, for public use It is the first civic symbol one encounters after coming out of a secluded house at the end of an obscure alley As much as it is a container of space, it is also contained within the city fabric The Mosque Al-Hakim has no monumental entry, but five different minor entries Frequently, a mosque is also used as a short-cut for another destination beyond the mosque Although the penetration of the mosque walls may take many forms, the primary destination is always the same It is a courtyard which can be called a monumental space

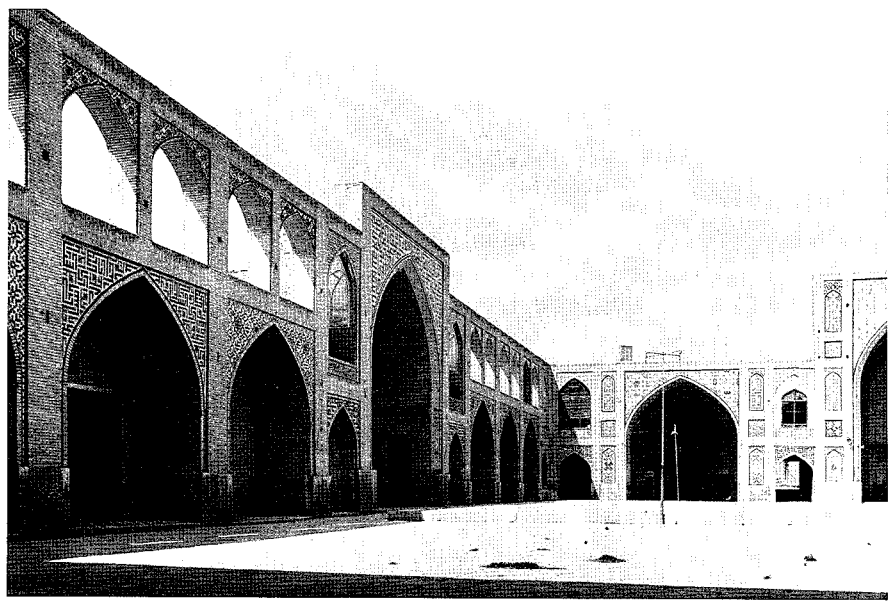




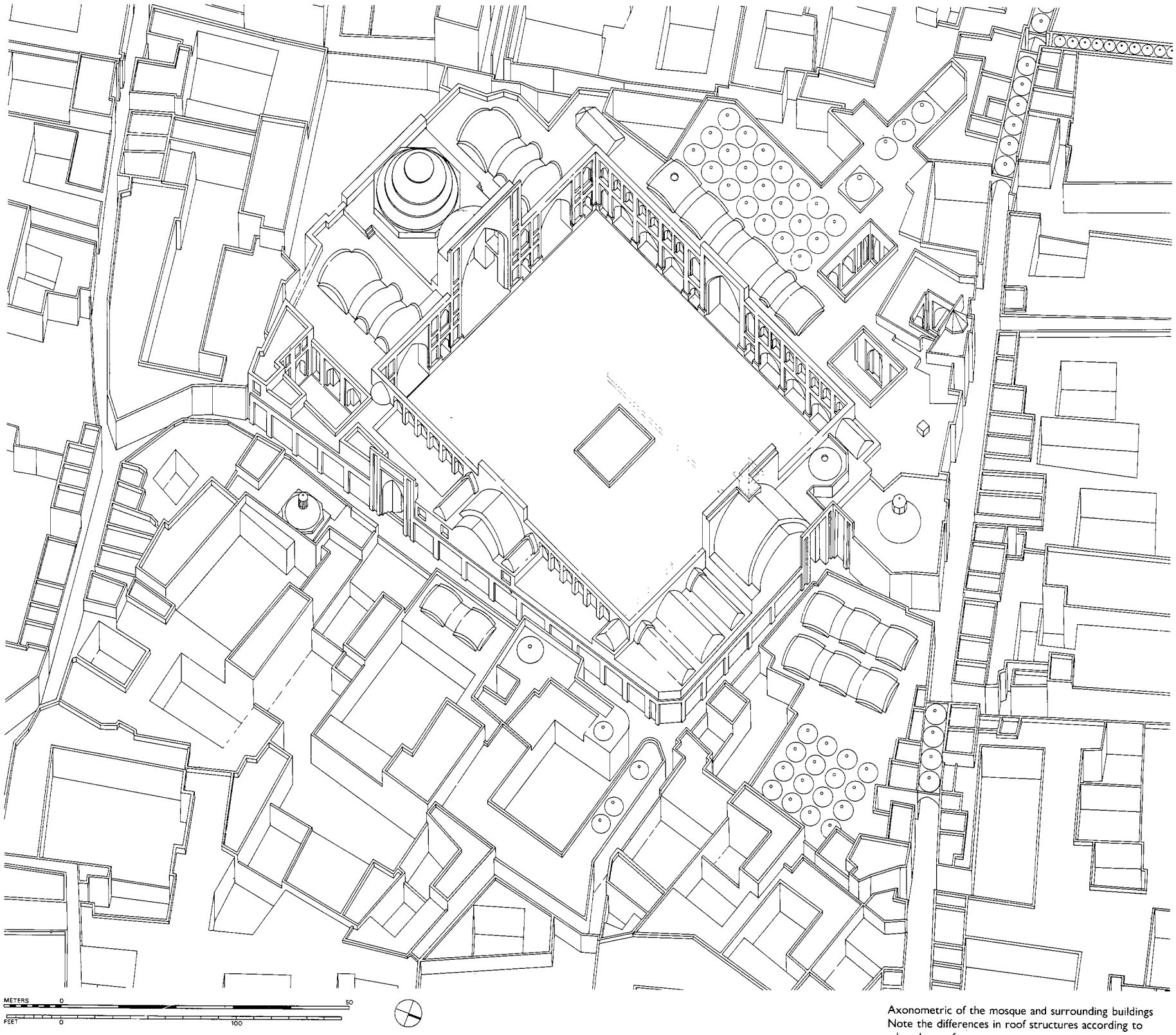
ASPECTS OF FORMAL STRUCTURE:
The internal organization of the Maidan courtyard, the Mosque Al-Hakim courtyard, a typical house courtyard and a single room is similar The same longitudinal axis dominates each space One or several cross axes organized spaces behind the subordinate walls The relationship of spaces off the courtyard is carried through in all examples: the niche in the wall of the room to the room, the room (*talar*) to the house courtyard, the prayer hall to the mosque courtyard and the mosque entry portal to the Maidan

A rooftop view reveals the kinship between the double-storey wall of the Maidan and its counterpart in the Mosque Al-Hakim The upper storey wall of the Maidan gives the illusion of balconies with rooms behind The upper storey wall of the mosque is perforated In both cases, the exaggerated treatment of the wall brings its height into proportion with the width of its court

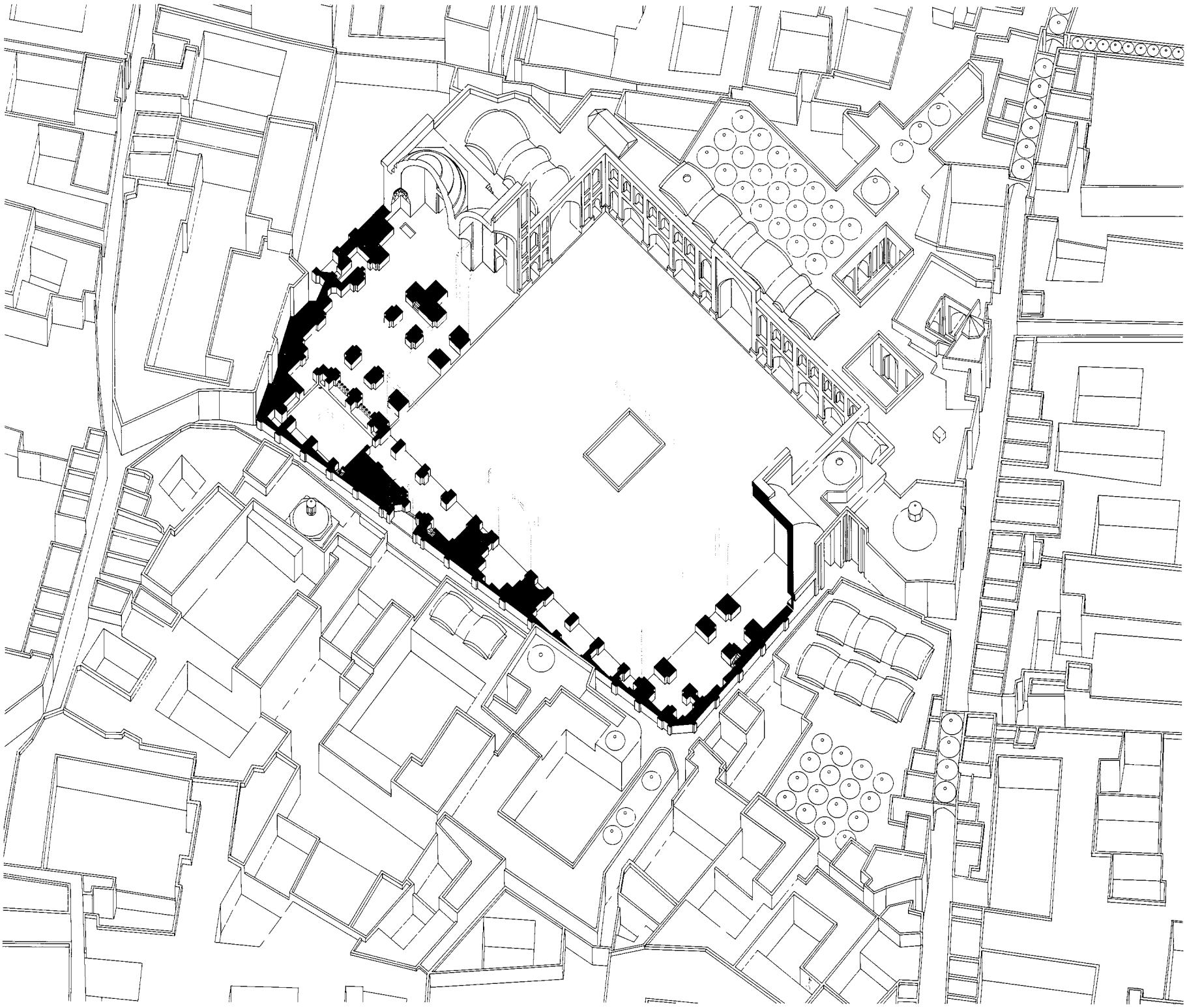


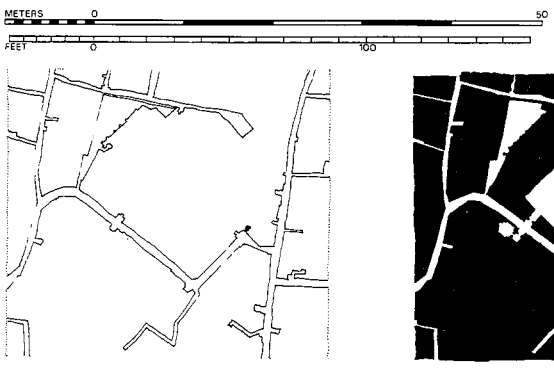


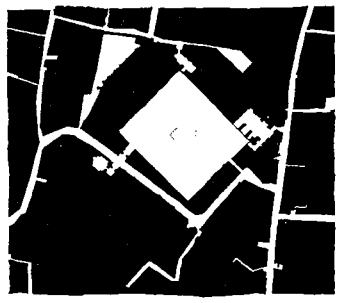
ABOVE: North corner of the main court with the screen-wall of the school to the left Straight ahead, one of the five side entrances from the street, with the caretaker's apartment above

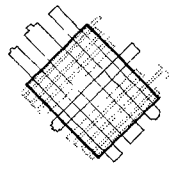


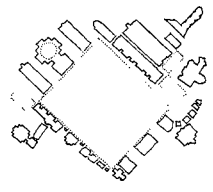
Axonometric of the mosque and surrounding buildings
Note the differences in roof structures according to what the roof covers







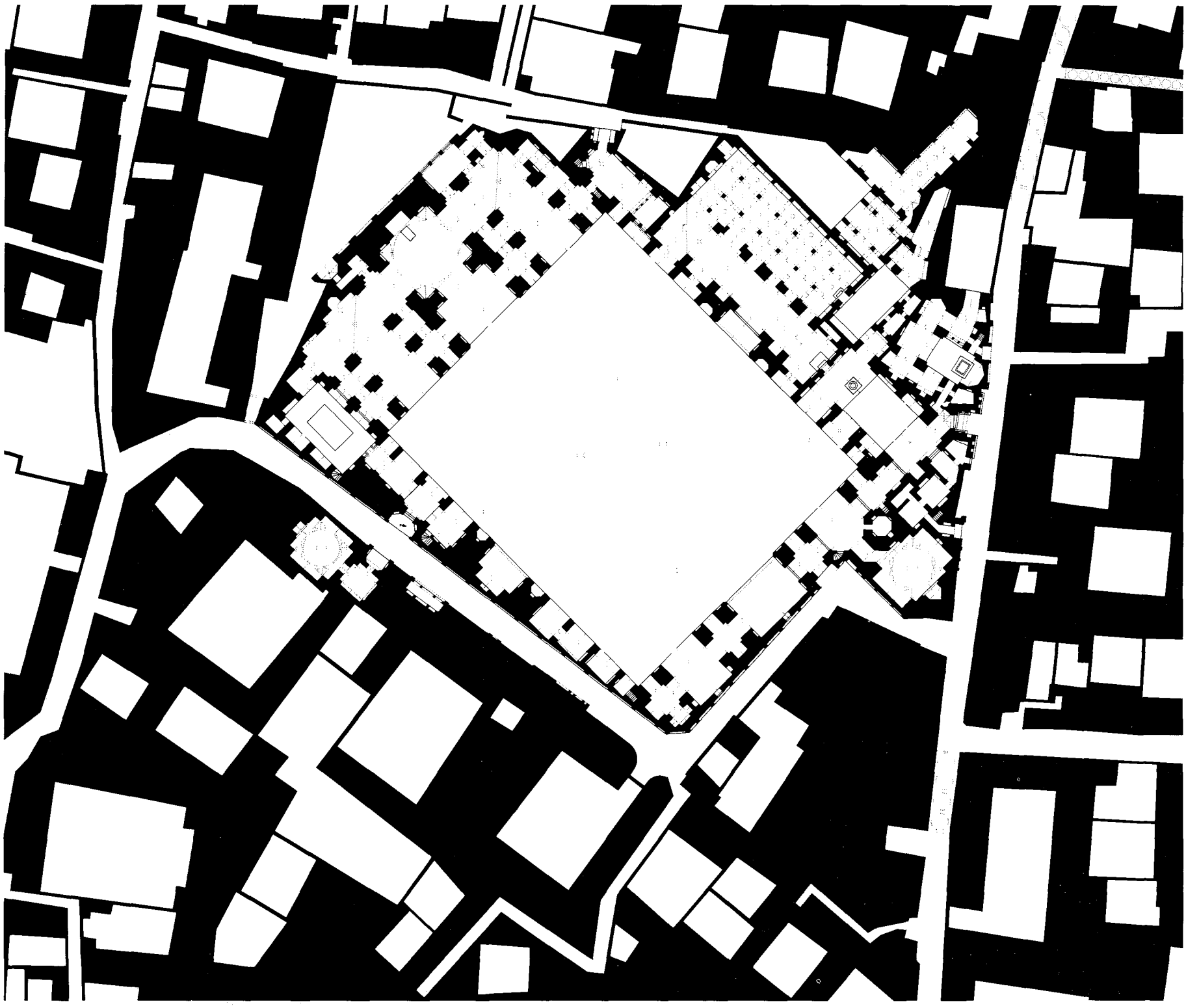




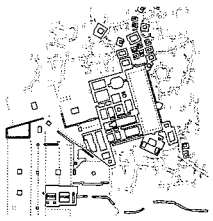
Axonometric cutting through northeast to southwest from prayer porch *(iwan)* to main *iwan,* leading to main domed prayer hall with prayer niche *(mihrab)* facing toward Mecca A large congregation would overflow from the prayer hall and fill the courtyard as necessary

ASPECTS OF FORMAL STRUCTURE:

FROM LEFT TO RIGHT: First, from the street, the mosque is not distinguished from any other building in the city fabric Second, once inside, the monumental courtyard space becomes the "piazza" of the neighborhood because of its intrinsic geometric order Third, below the screen wall there is an implied spatial "tartan" grid Fourth, mosque related spaces depend on the coherence of the courtyard

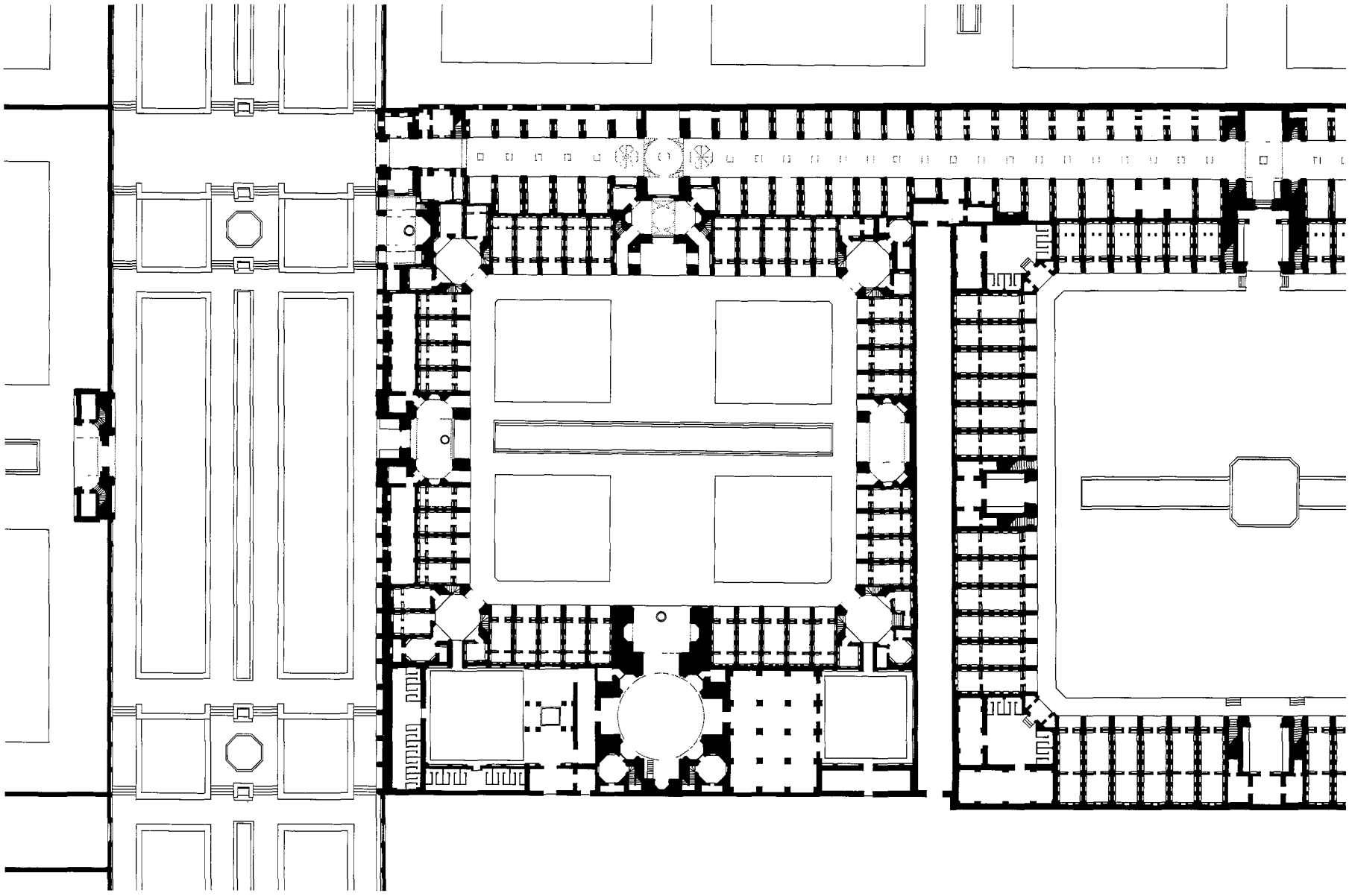


Figure/ground plan showing interlocking of mosque with neighborhood buildings The mosque incorporates the older Seljuk structures to the north An interlocking device is the tomb of a saint, the entry of which faces one of the five entrances to the mosque at the southeast The relationship is a small-scale application of the same principle which governs the Jarchi mosque-fountain dialogue

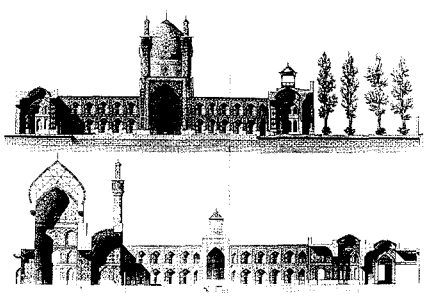


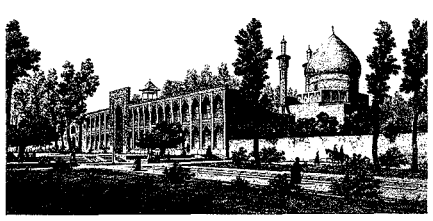
MADRASA MADIR-I-SHAH

ISFAHAN



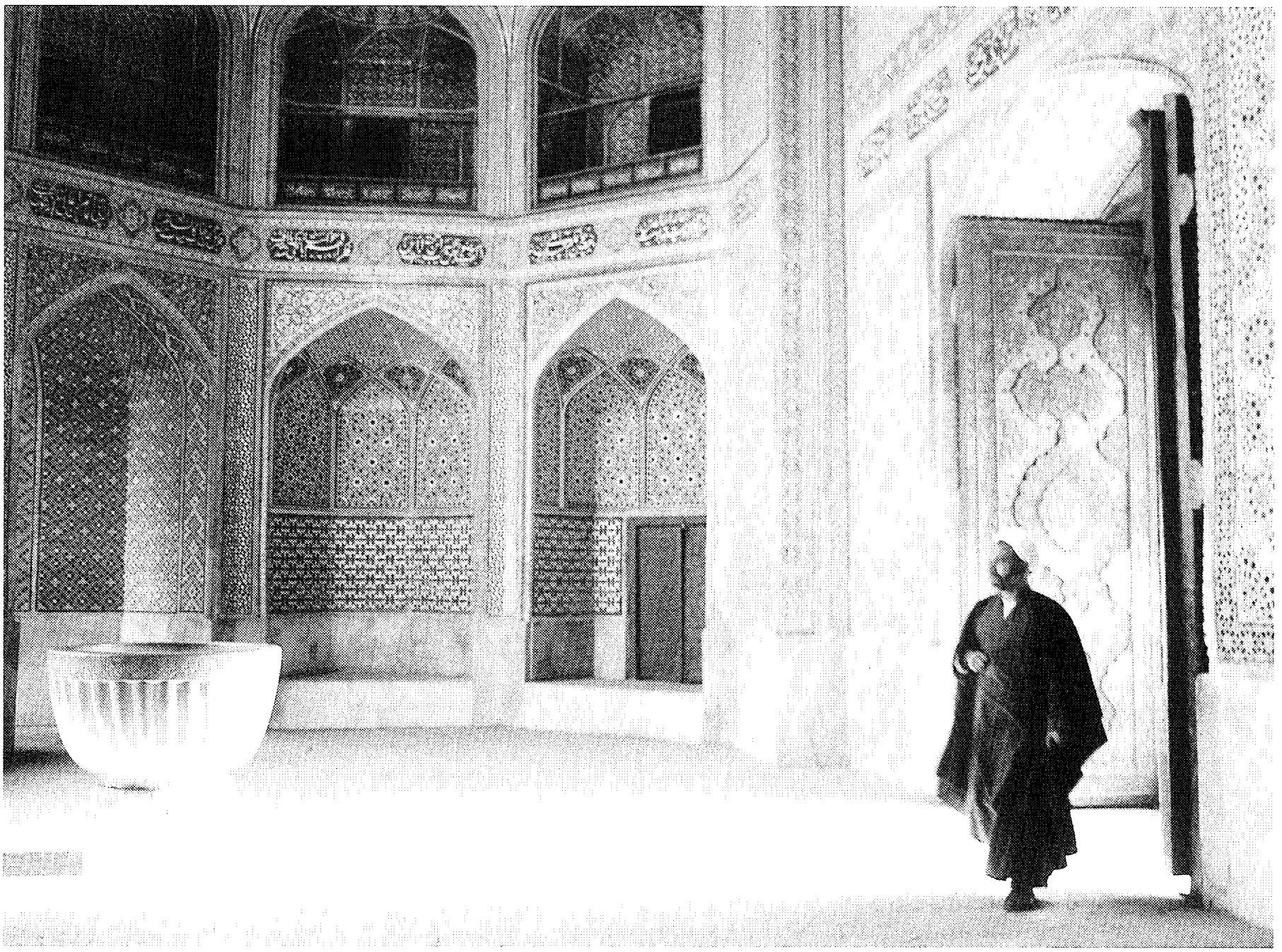
Plan of Madrasa Madir-I-Shah, also called the Madrasa of Chahar Bagh It contains 150 cells for the students of theology



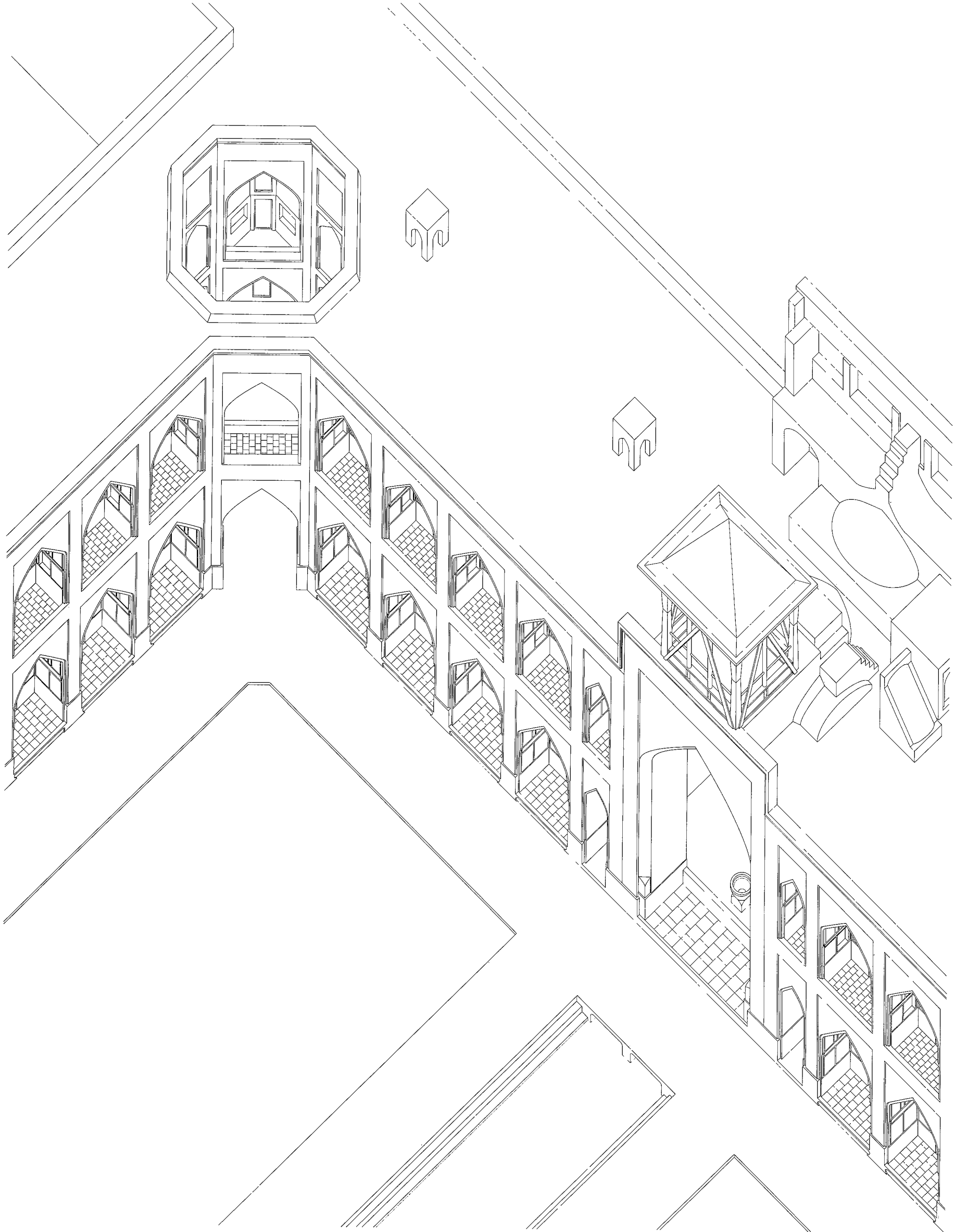


FAR LEFT: East-west section (above) and north-south section through madrasa, 19th century (from Coste)

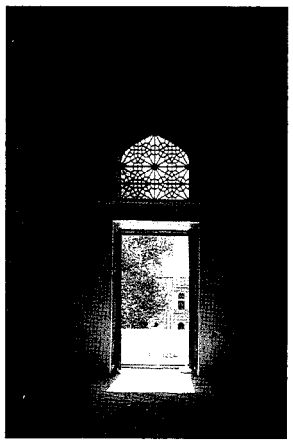
LEFT: Western facade of madrasa looking toward Chahar Bagh, 19th century (from Coste)



The main entrance to Madrasa Madir-I-Shah from Chahar Bagh Main entrances to both private and public Iranian buildings of this time are often octagonal and thus are called *hashti* (hasht meaning eight)



Axonometric of southwest corner of courtyard

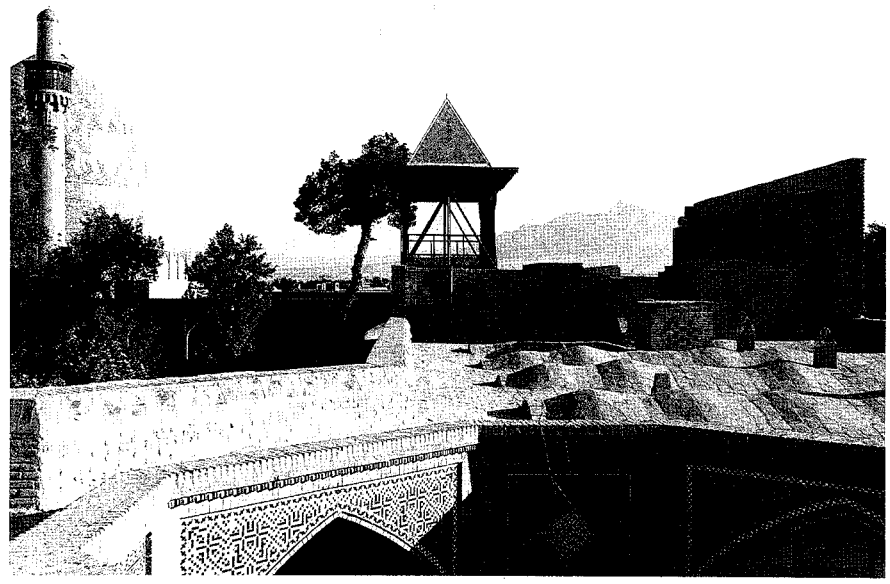


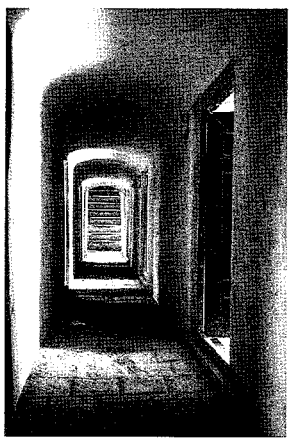
Madrasa Madir-I-Shah ("Mother of the Shah") is located among the many gardens along the Chahar Bagh in Isfahan The Madrasa Madir-I-Shah was built 1706–1714 by Shah Sultan Hussein (1694–1722) in honor of his mother This was the last of the Safavid buildings before the Afghans sacked the city in 1731

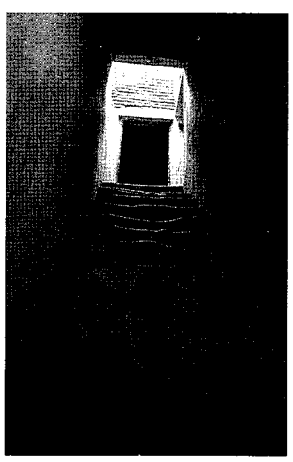
A madrasa is an Islamic college, primarily for the training of holy men *(mullas)* The only school available at that time, it was the main center for dispensing all forms of learning The income-generating stalls (known as the Bazaar-I-Boland) and caravansarai provided the funds for upkeep of the madrasa—an example of the *Waqf* in operation The caravansarai has since been converted into the Shah Abbas I Hotel.

There are only two entrances to the madrasa The four corners contain octagonal service courts which provide access to service rooms and the upper level of cells

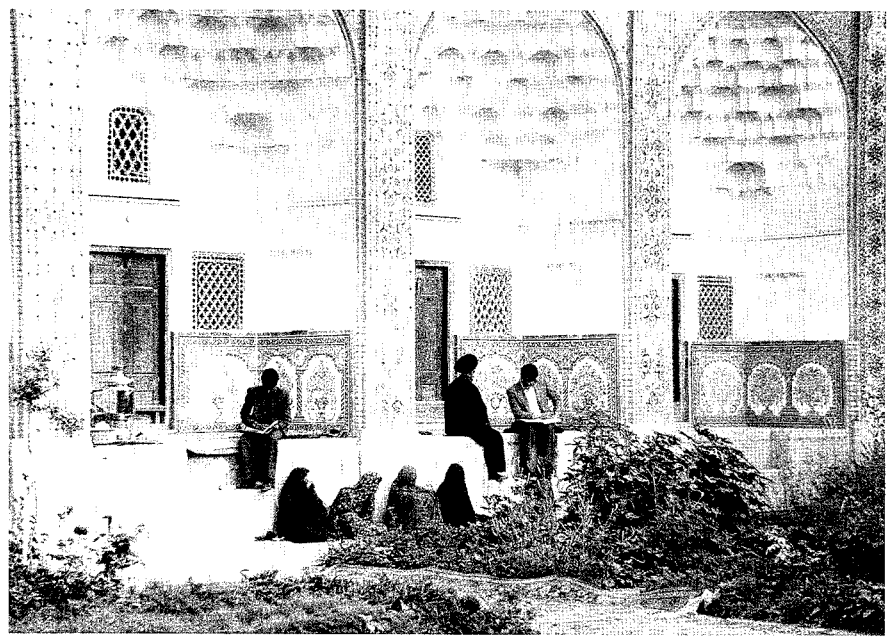
RIGHT: Roofscape of madrasa looking south from an octagonal service/access court



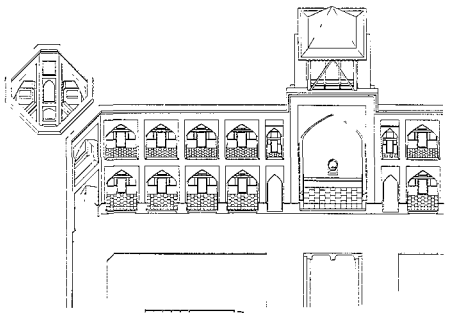




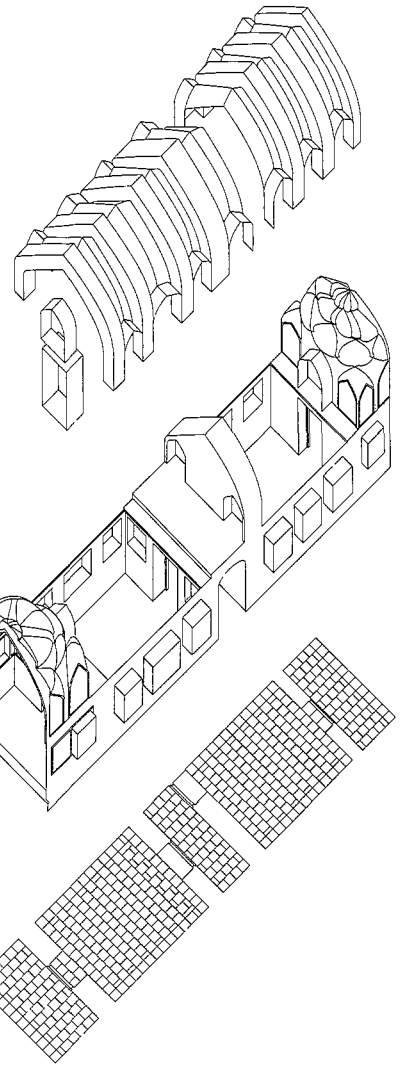
RIGHT: A typical teaching/learning situation in a madrasa in Kerman Note the relationship of those seated to the architectural elements which surround them, such as the scale of the seated human figure on the porch to the wainscotting behind This scale relationship is the same as that of the figures seated on the ground to the lower porch wall behind



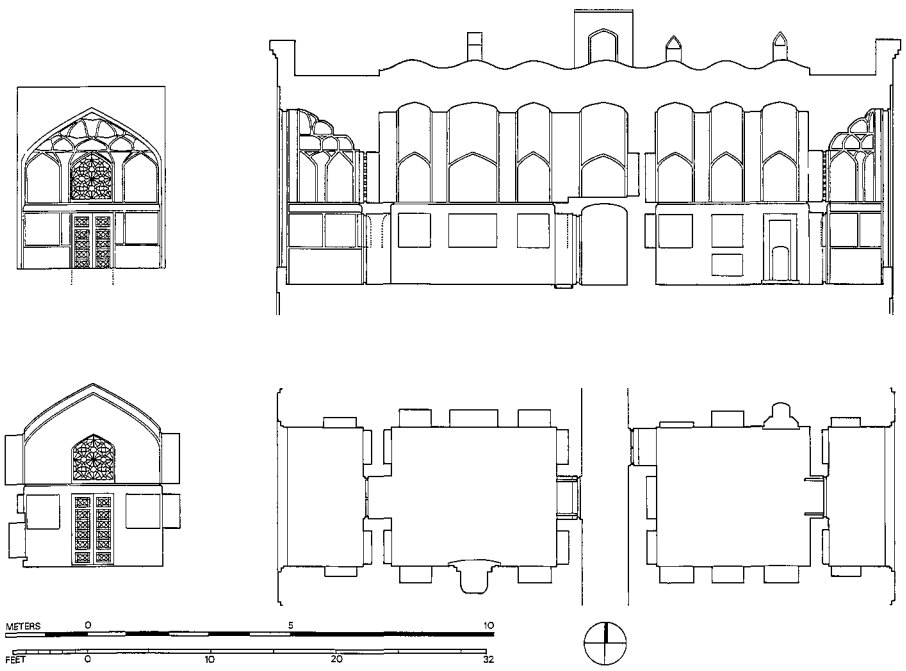
LEFT: Reading from bottom to top, the entry sequence to a typical upper floor cell on the western side of the court



RIGHT: Ninety degree axonometric of court and octagonal service court showing western part of courtyard



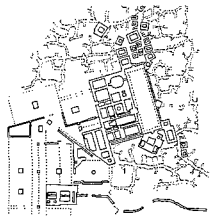
LEFT: Typical upper cell porch



LEFT: Plan and sections of upper floor cells showing a rare occurrence of the double loaded corridor The cell on the courtyard side is given more privilege Its major axis connects the entry with the porch, while its minor axis runs through the fireplace A special sleeping loft is formed by the space over the corridor The cell's orientation is toward the courtyard and it has a deeper balcony than the cells facing outside

In the recurrence and the repetition of the form of a "court" (from the Maidan to the courtyard to the cell) the idea of a fabric that is made of one cloth is reinforced

ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: Top and middle, spacial analysis of the privileged cell facing the courtyard and its neighbor facing the Chahar Bagh Bottom, the care with which privilege is indicated can be seen in the floor pattern of tiles Just after the entry to the privileged cell a band of tiles in different patterns indicate a special condition (in this case the sleeping loft above)



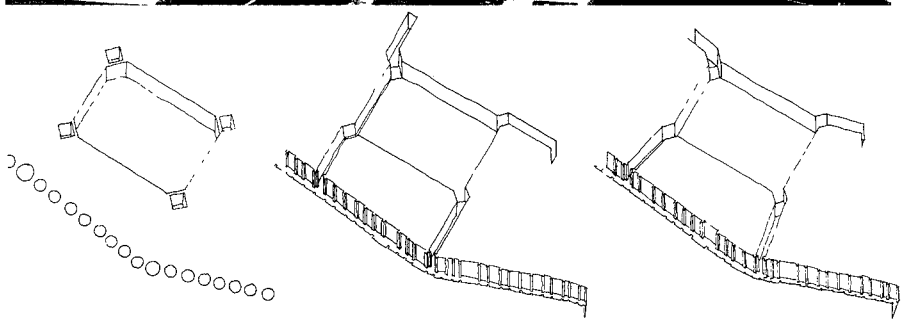
BAZAAR: CARAVANSARAI-I-GULSHAN MOSQUE-I-JARCHI

ISFAHAN

METERS 0 50

FEET 0 100

Caravansarai-I-Guishan, located on the Isfahan Bazaar, was built in the 17th century by Jarchi-Bashi, an *Emir* in the reign of Shah Abbas I (1587–1629)



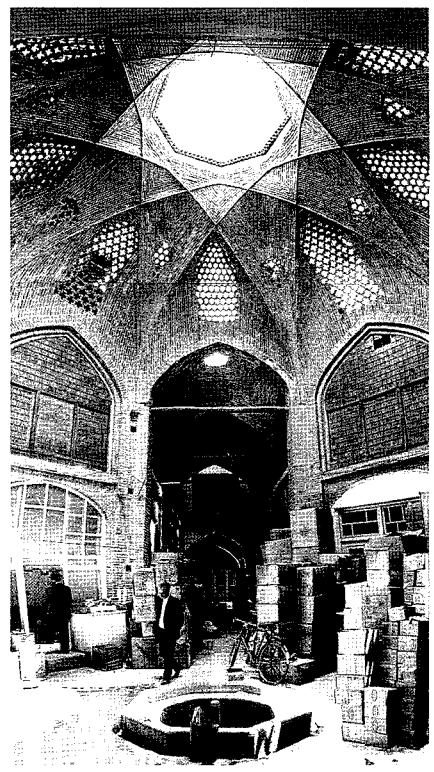
A caravansarai is a hostel for caravans and individual travelers, with provisions for trade The wholesale merchandise from outside the city is sold here to the retailers in the bazaar, thus the caravansarai acts as a "filter"

Caravansarai-I-Gulshan is located on the Isfahan Bazaar and was built in the 17th century by Jarchi-Bashi, a courtier of Shah Abbas I (1587–1629)

RIGHT: Vaulted space for selling merchandise *(Ṭimchah)*, connecting main bazaar to Haji Karim Khan Caravansarai

LEFT: Typical segment of bazaar with caravansarais and madrasas (Islamic colleges) attached to it

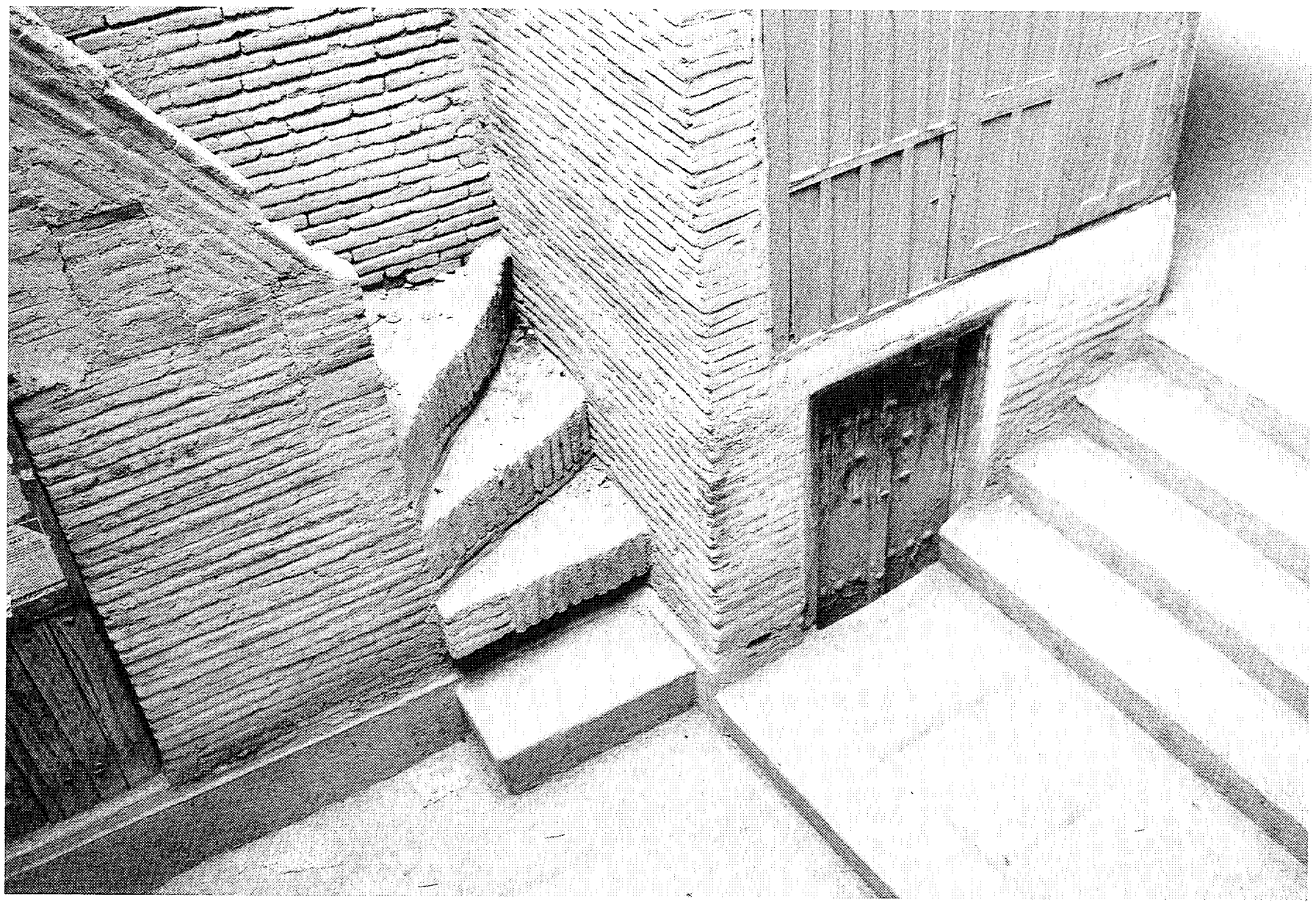
ASPECTS OF FORMAL STRUCTURE:
FROM LEFT TO RIGHT: First, the typical relation of a caravansarai (such as Gulshan) to the bazaar The caravansarai has a pure courtyard against the winding bazaar Second, the connecting corridors between the caravansarai and the bazaar are usually parallel to the sides of the court and function as "mini-bazaars" Third, alternate connections The presence of small mediating spaces off the corners of the courtyard enable shifts in orientation These spaces are placed at 45 degrees to the two axes of the courtyard



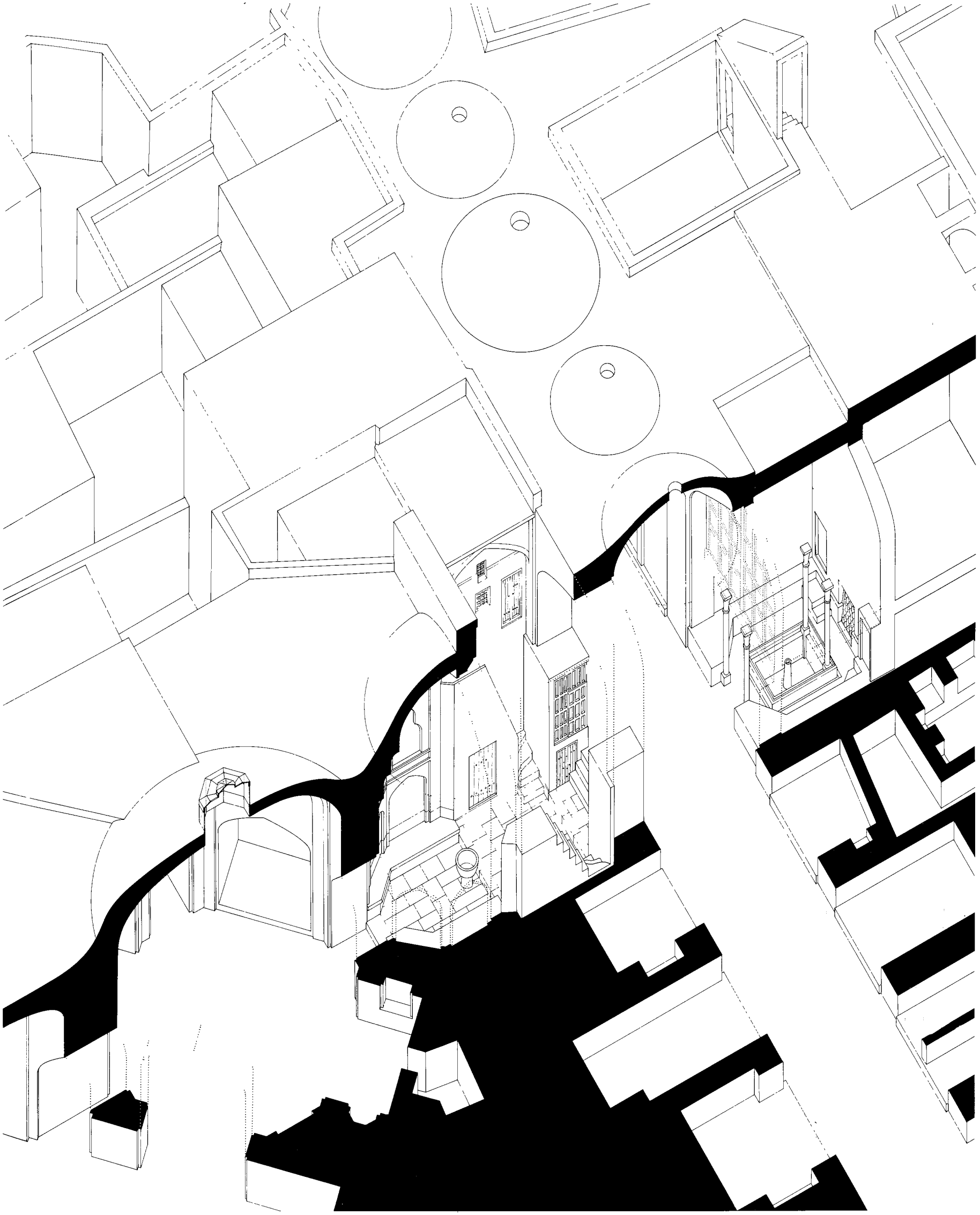
RIGHT: Typical interior segment of main bazaar, showing the textile section

LEFT: A typical "planned" bazaar (far left) on a Friday; the enclosing structure is built first A typical "ad-hoc" bazaar; commercial and private buildings are built along a street by accretion, with the structures providing shade erected as needed

ASPECTS OF FORMAL STRUCTURE:
FROM LEFT TO RIGHT: A typical "ad-hoc" bazaar and a typical "planned" bazaar While the space of the first bazaar is irregular in all directions, the second is characterized by domed structural bays which are rhythmically organized



Stairs descending from bazaar (right) and keeper's apartment (left) into courtyard in front of Mosque-I-Jarchi



Cut axonometric through sequence of spaces from mosque to fountain

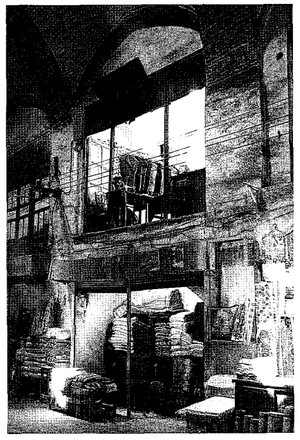
BAZAAR: AMENITY

ISFAHAN

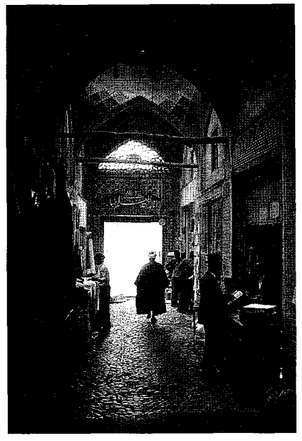
The Isfahan bazaar is the commercial "backbone" of the city Because of its pleasant micro-climate all year round, the bazaar is also used as the city's "Main Street": meeting people, seeing and being seen

The pious institution of *Waqf* endows, not only mosques and other religious buildings with the income of donated bazaar stalls, but also maintains public fountains and hygenic amenities The fountain across from the Jarchi Mosque is a good example of this principle at work

Plan and east-west section through Caravansarai-I-Gulshan, a public rest place with a fountain, the main bazaar, the entry to the Mosque-I-Jarchi and the mosque itself



ABOVE: Typical bay of main bazaar with vending stall below, lit by the oculus of the dome, and the workroom above, lit by a window in the wall The difference in character of the lighting reinforces the impression that the lower floor is dug out like a cave while the upper floor is open to the bazaar as well as the outside The interior bays dictate the rhythm, and all kinds of conditions can occur adjacent to the bazaar



ABOVE: Connection from main bazaar to Caravansarai-I-Gulshan allows for development of a mini-bazaar

ASPECTS OF FORMAL STRUCTURE:
The axial relationship between the public rest place with fountain and the mosque entrance is qualified by a number of formal, experiential and implicitly cultural characteristics, explicated in two diagrams (right)

1 Even though both the mosque and fountain are pious institutions *Waqf* one larger than the other, their relationship to one another is not obvious because the bazaar dominates the entire spatial experience This condition existed at the time when the mosque was first built

2 With the later physical connection of *mosque iwan* to bazaar, a spatial continuity between mosque door and rear wall of fountain room is created (marked by an inclined plane symbolizing, with its fish scale surface, a small waterfall)

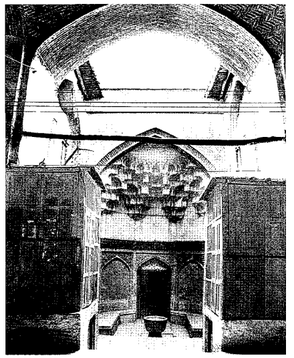
3 There is a contrast between the relative formality of *mosque iwan* (form and decoration) and fountain place (form and fine sculptural treatment of its principal elements: waterfall plane, fountain, columns) and the pair of connecting stair walls, inserted in a vernacular manner This contrast helps to maintain the original face-to-face relationship intact while adding a new element: a well-defined forecourt to the mosque, open to the sky

4 The illusionary disappearance of the otherwise dominant bazaar-corridor, when viewed along the fountain-mosque axis, is in large measure due to the fundamental imbalance of the two spaces off the bazaar It is a subtly calculated imbalance, achieved by the orchestration of formal and experiential elements in a way that the axial relationship acquires a clear thrust from waterfall plane to mosque door The spaces "telescope" from low, closed, cool, dark, and grotto-like to high, roofless, warm and light-flooded; two columns "jump" forward out of the pool as the stairs ascend toward the arch of the *iwan*, toward even more light

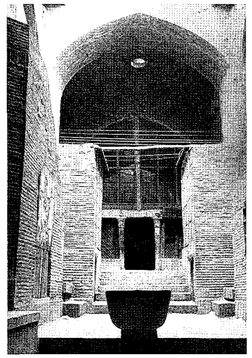
5 Fountain room and mosque entry thus become one coherent whole The domed bay of the bazaar which connects them also separates them as one moves through the bazaar

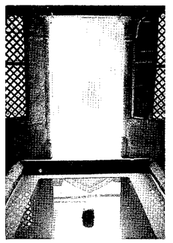
BELOW: Visual sequence from fountain to mosque

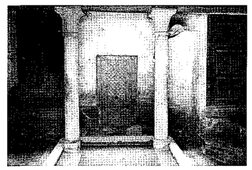
BELOW: Shadowy bazaar space intersecting the light-filled space of the mosque-fountain dialogue

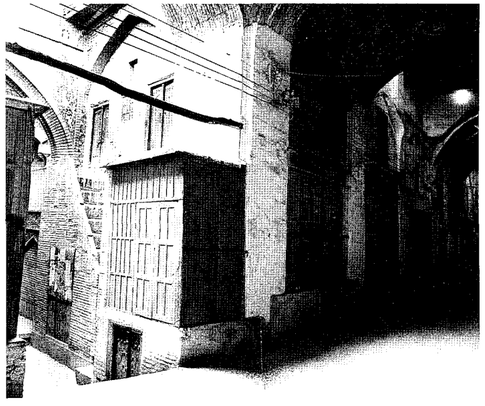


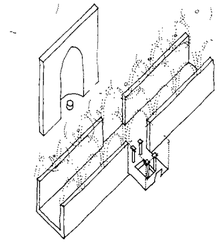
BELOW: Visual sequence from mosque to fountain The bazaar, which runs transverse to the mosque-fountain axis, seems negated

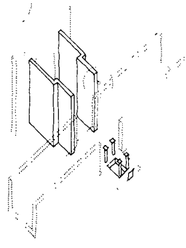


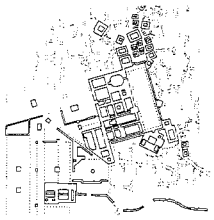






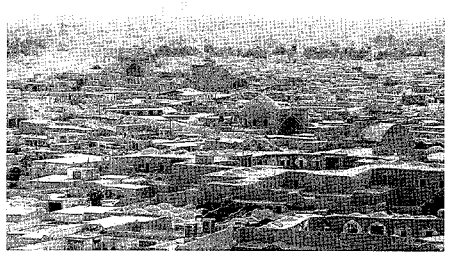




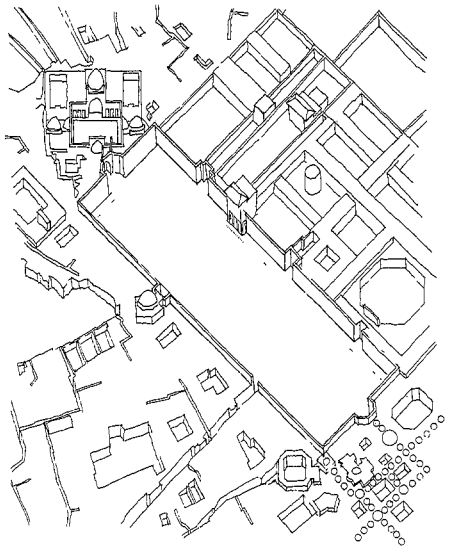


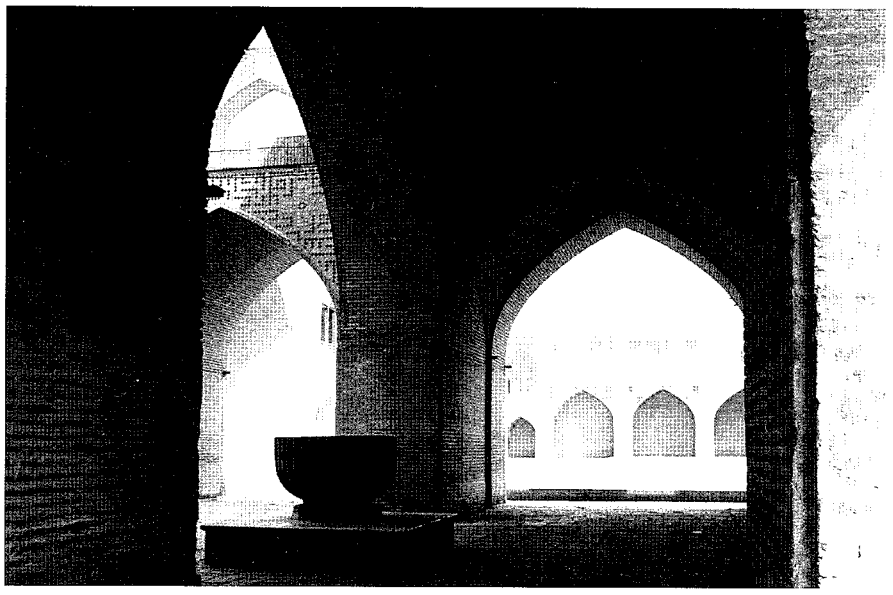
MOSQUE AL-HAKIM

ISFAHAN



ABOVE: Mosque Al-Hakim embedded in the city fabric

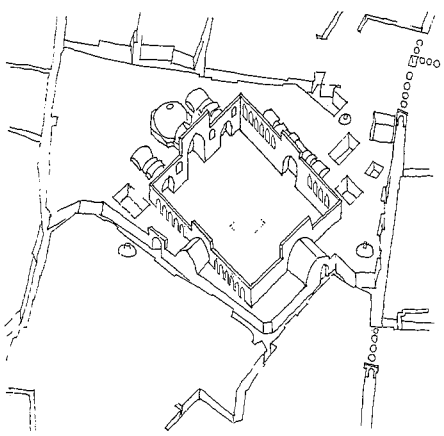


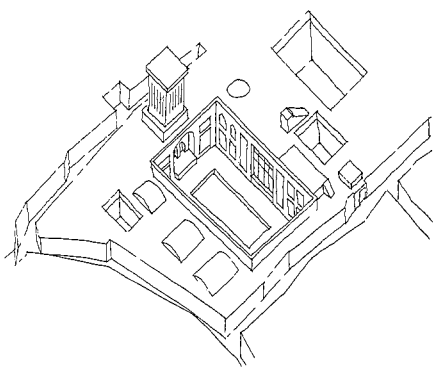


ABOVE: Approaching the main courtyard from the northwest

Mosque Al-Hakim, located near the bazaar, was built in 1654 during the reign of Shah Abbas II (1648–66) by Doctor (Hakim) Daud, who fled from Isfahan to India After making his fortune there under the grand Moghuls, Hakim Daud financed this mosque in Isfahan in his name

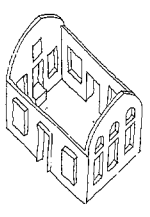
A mosque is not only a house of worship, but also a public building serving a multiplicity of uses It is a gathering place for prayers five times a day, an Islamic college, a community center for functions with present day Western associations, and an emergency shelter for travelers A mosque contains amenities, such as wash rooms and toilets, for public use It is the first civic symbol one encounters after coming out of a secluded house at the end of an obscure alley As much as it is a container of space, it is also contained within the city fabric The Mosque Al-Hakim has no monumental entry, but five different minor entries Frequently, a mosque is also used as a short-cut for another destination beyond the mosque Although the penetration of the mosque walls may take many forms, the primary destination is always the same It is a courtyard which can be called a monumental space

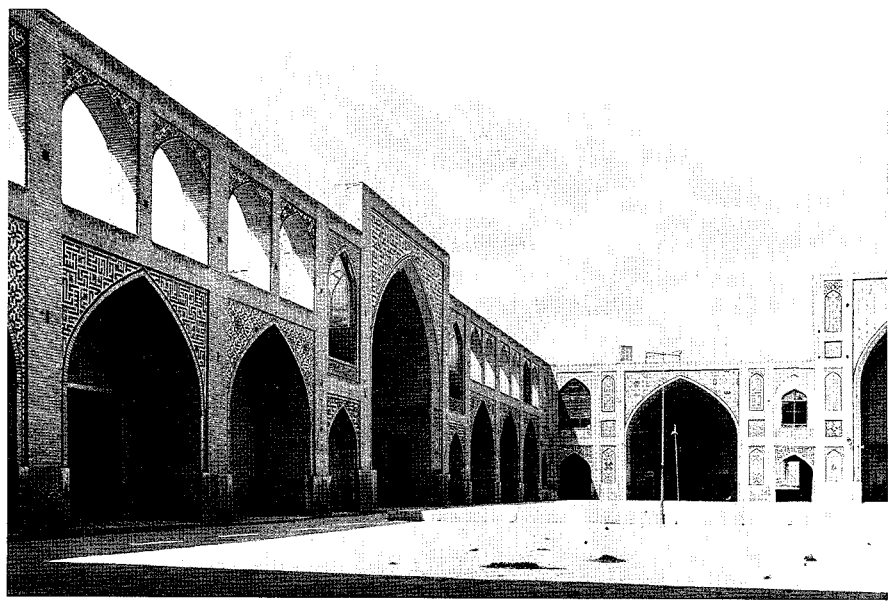




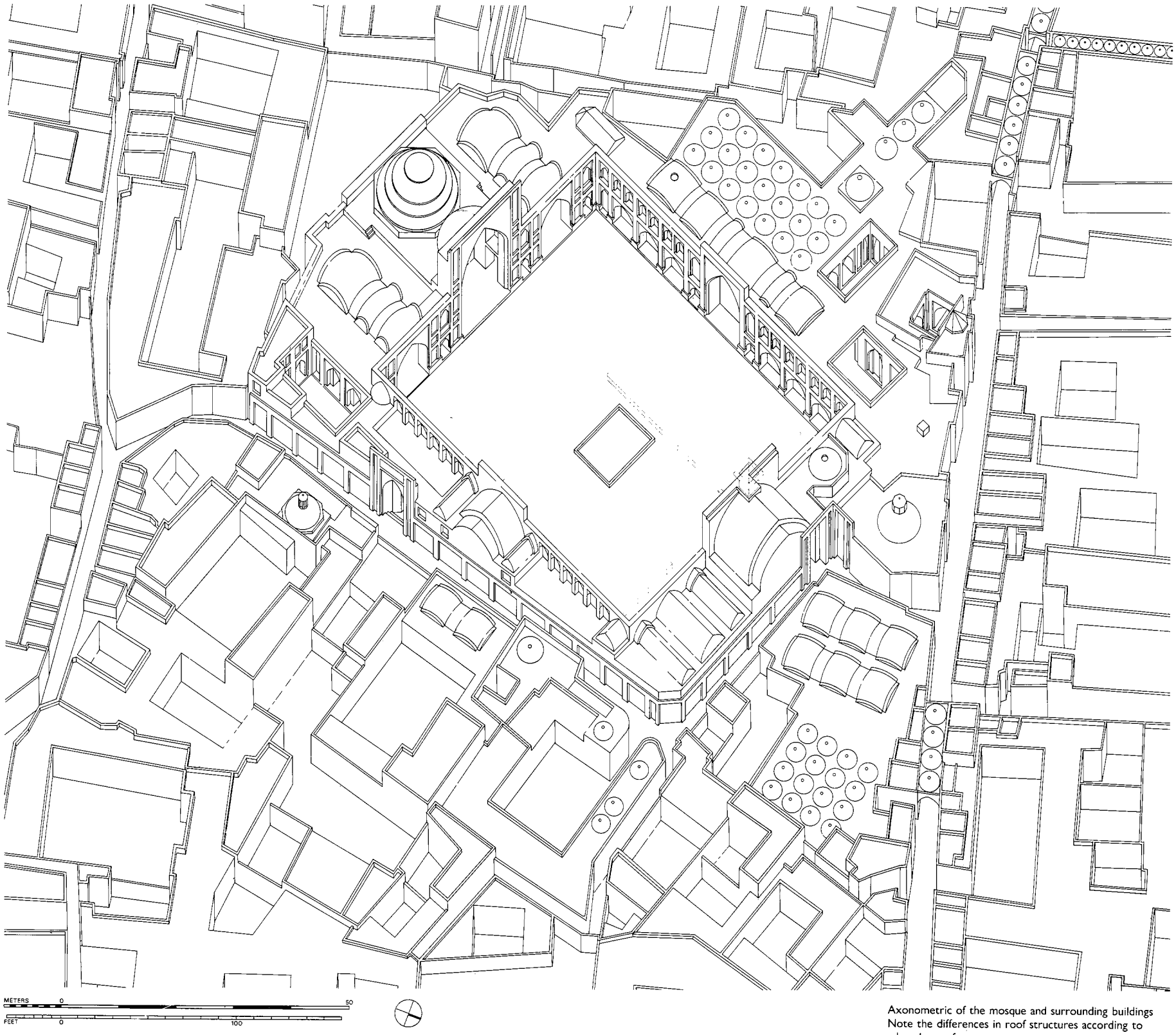
ASPECTS OF FORMAL STRUCTURE:
The internal organization of the Maidan courtyard, the Mosque Al-Hakim courtyard, a typical house courtyard and a single room is similar The same longitudinal axis dominates each space One or several cross axes organized spaces behind the subordinate walls The relationship of spaces off the courtyard is carried through in all examples: the niche in the wall of the room to the room, the room (*talar*) to the house courtyard, the prayer hall to the mosque courtyard and the mosque entry portal to the Maidan

A rooftop view reveals the kinship between the double-storey wall of the Maidan and its counterpart in the Mosque Al-Hakim The upper storey wall of the Maidan gives the illusion of balconies with rooms behind The upper storey wall of the mosque is perforated In both cases, the exaggerated treatment of the wall brings its height into proportion with the width of its court

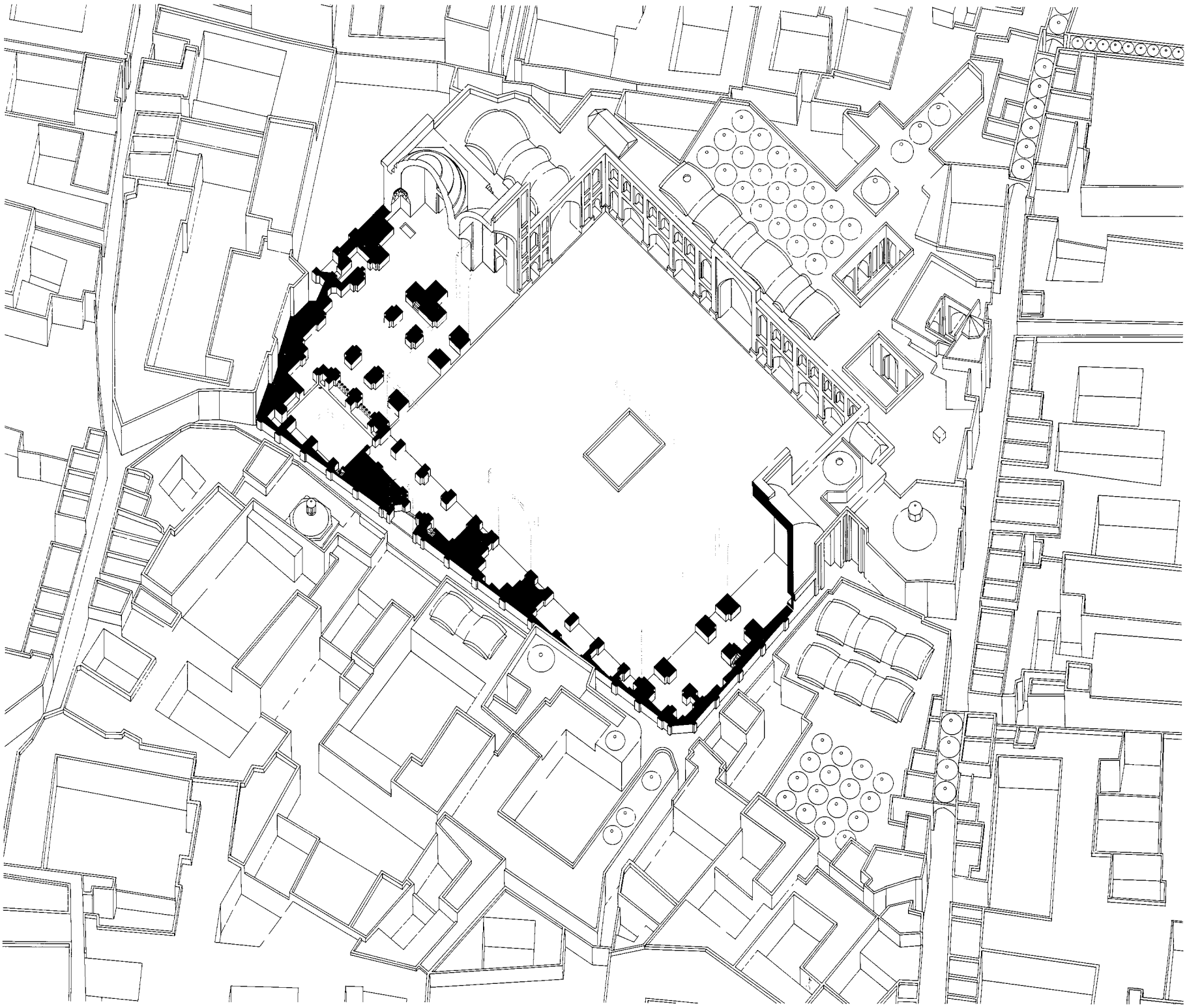


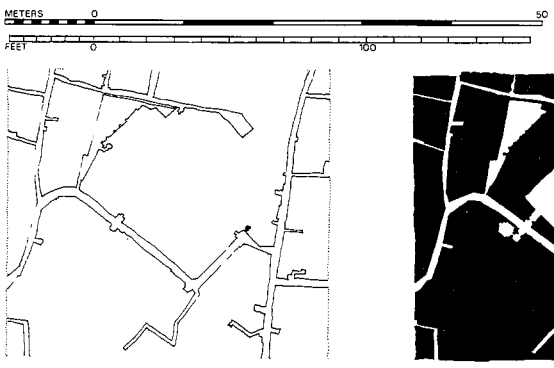


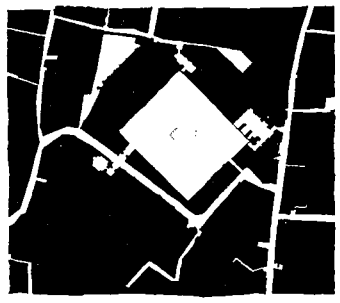
ABOVE: North corner of the main court with the screen-wall of the school to the left Straight ahead, one of the five side entrances from the street, with the caretaker's apartment above

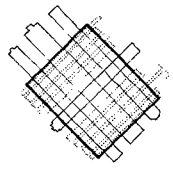


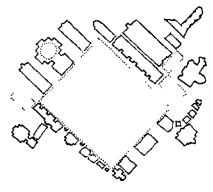
Axonometric of the mosque and surrounding buildings
Note the differences in roof structures according to what the roof covers







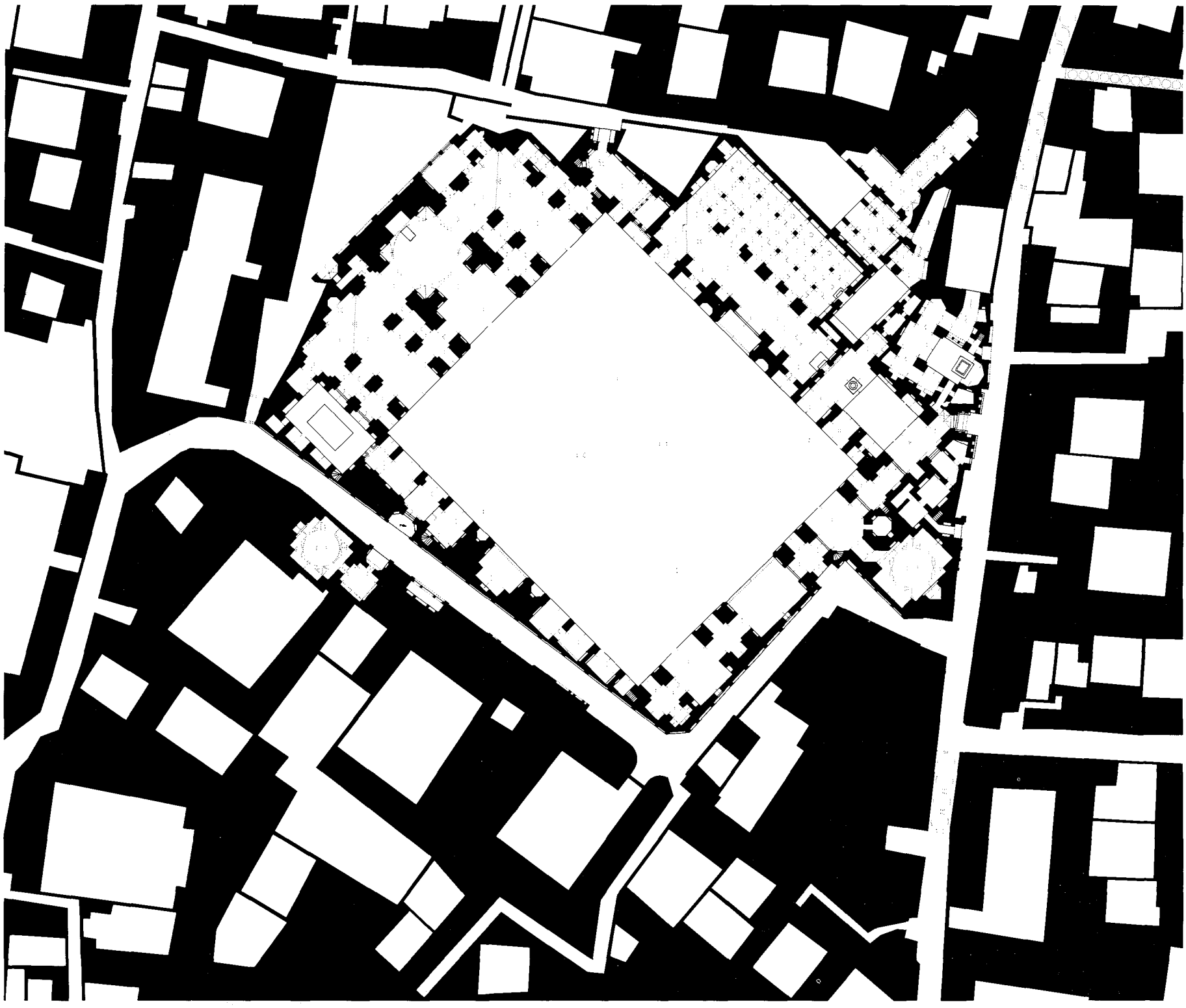




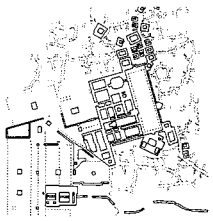
Axonometric cutting through northeast to southwest from prayer porch *(iwan)* to main *iwan,* leading to main domed prayer hall with prayer niche *(mihrab)* facing toward Mecca A large congregation would overflow from the prayer hall and fill the courtyard as necessary

ASPECTS OF FORMAL STRUCTURE:

FROM LEFT TO RIGHT: First, from the street, the mosque is not distinguished from any other building in the city fabric Second, once inside, the monumental courtyard space becomes the "piazza" of the neighborhood because of its intrinsic geometric order Third, below the screen wall there is an implied spatial "tartan" grid Fourth, mosque related spaces depend on the coherence of the courtyard

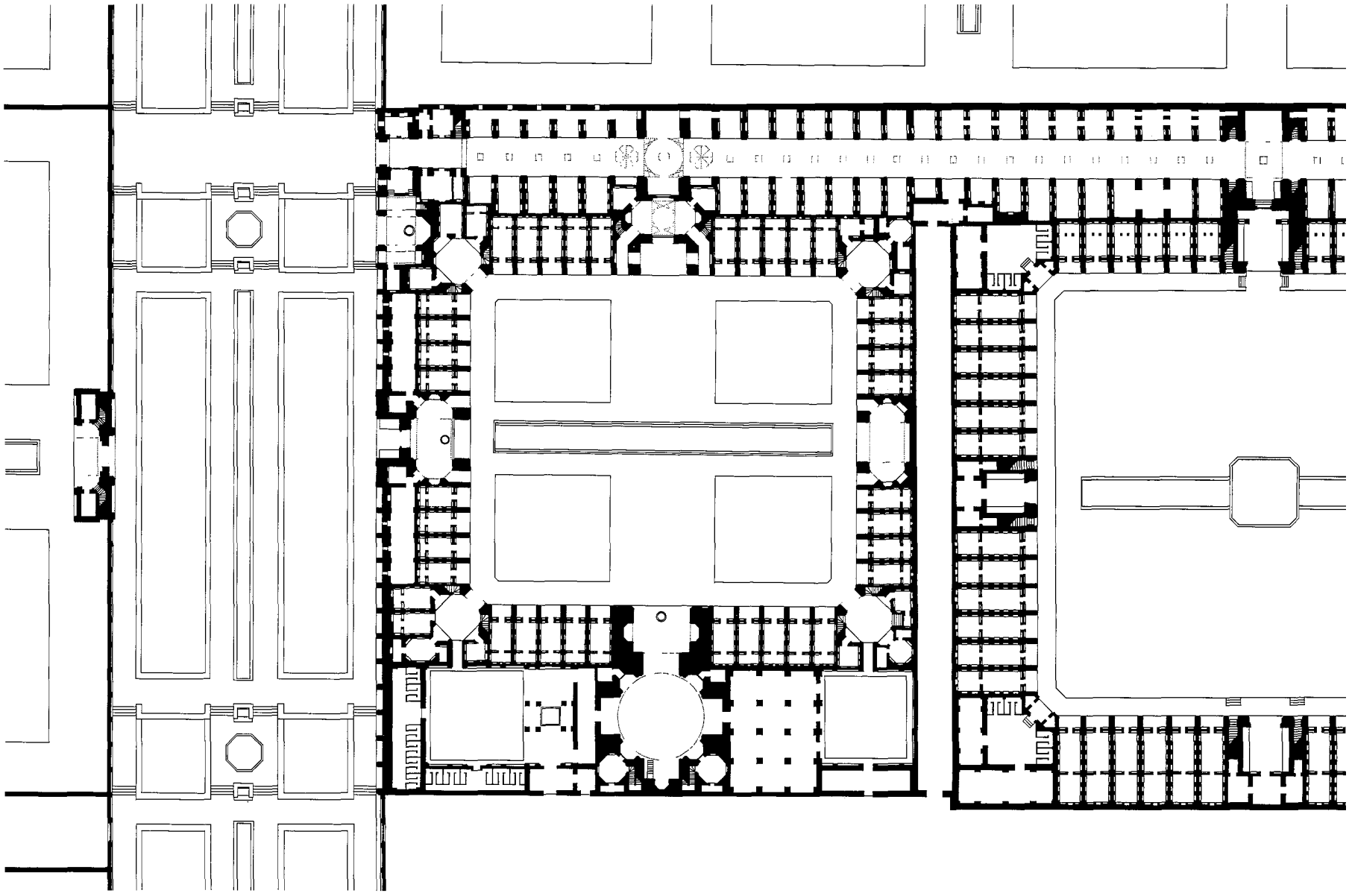


Figure/ground plan showing interlocking of mosque with neighborhood buildings The mosque incorporates the older Seljuk structures to the north An interlocking device is the tomb of a saint, the entry of which faces one of the five entrances to the mosque at the southeast The relationship is a small-scale application of the same principle which governs the Jarchi mosque-fountain dialogue

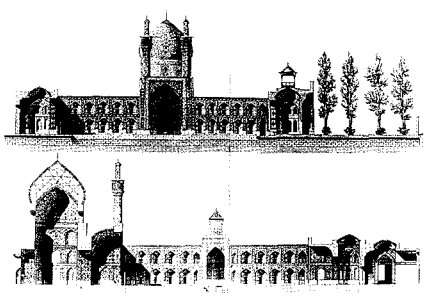


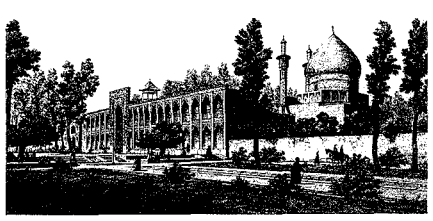
MADRASA MADIR-I-SHAH

ISFAHAN



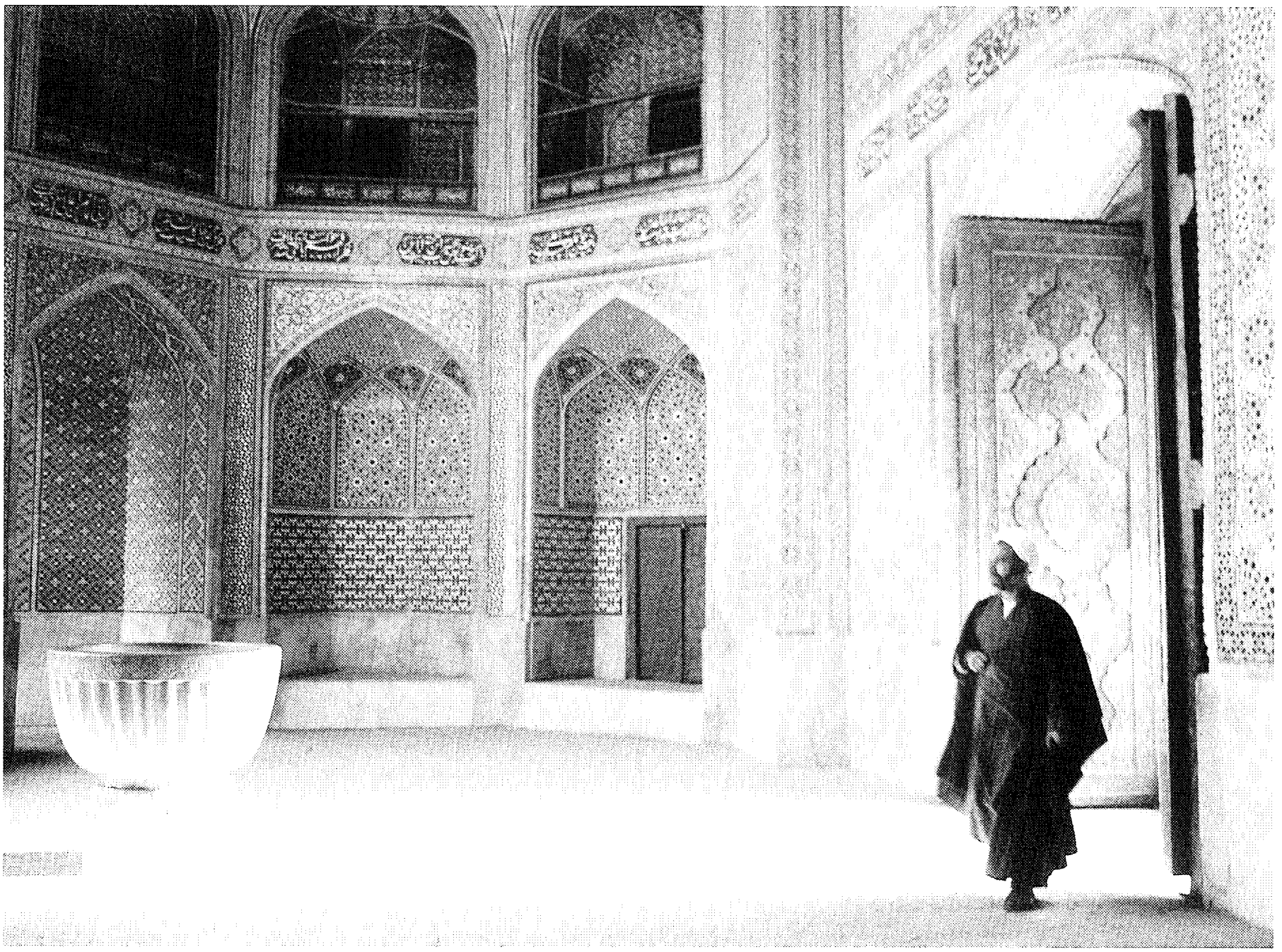
Plan of Madrasa Madir-I-Shah, also called the Madrasa of Chahar Bagh It contains 150 cells for the students of theology



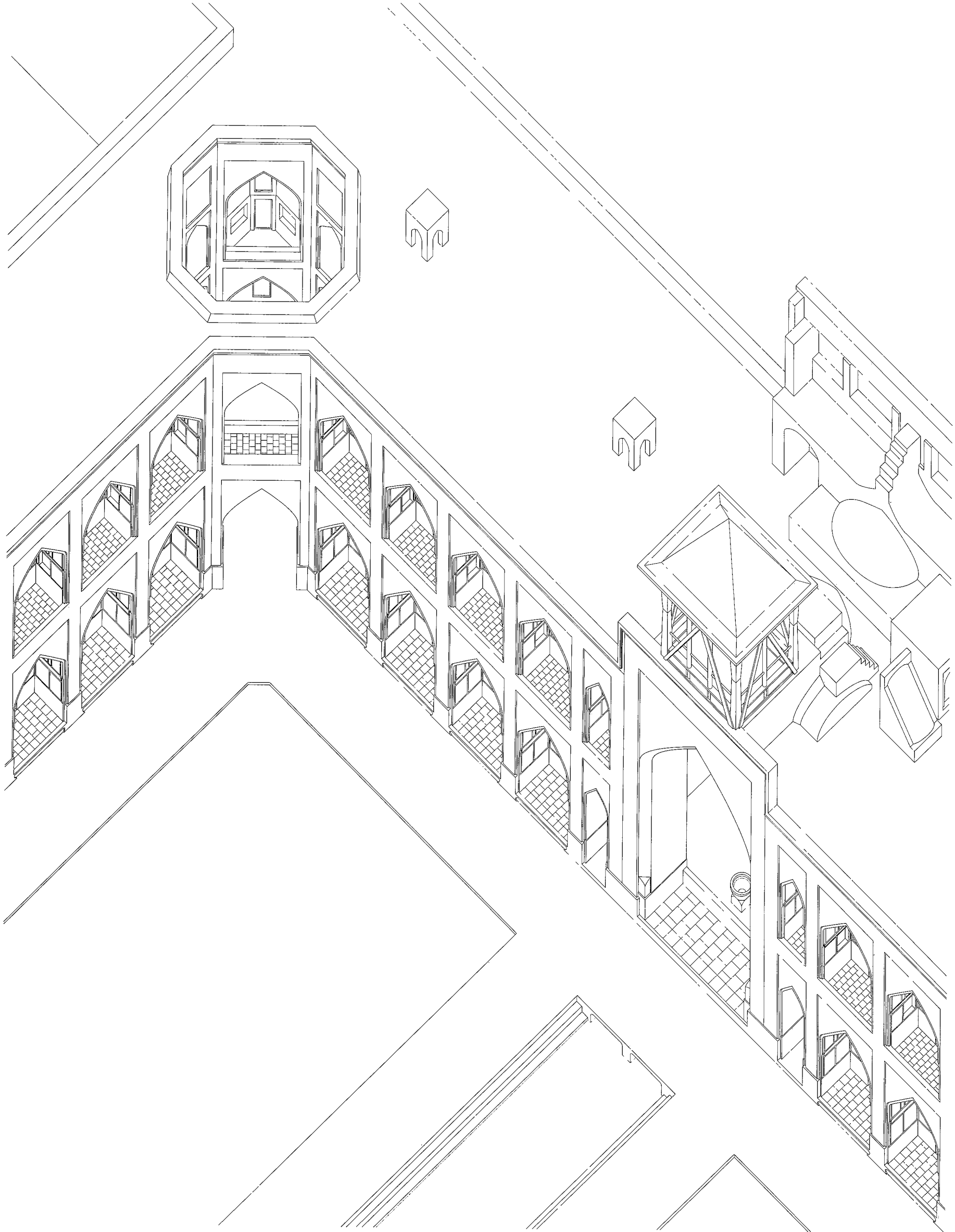


FAR LEFT: East-west section (above) and north-south section through madrasa, 19th century (from Coste)

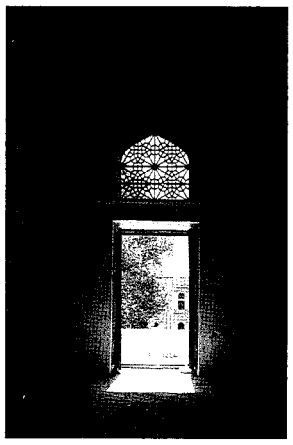
LEFT: Western facade of madrasa looking toward Chahar Bagh, 19th century (from Coste)



The main entrance to Madrasa Madir-I-Shah from Chahar Bagh Main entrances to both private and public Iranian buildings of this time are often octagonal and thus are called *hashti* (hasht meaning eight)



Axonometric of southwest corner of courtyard

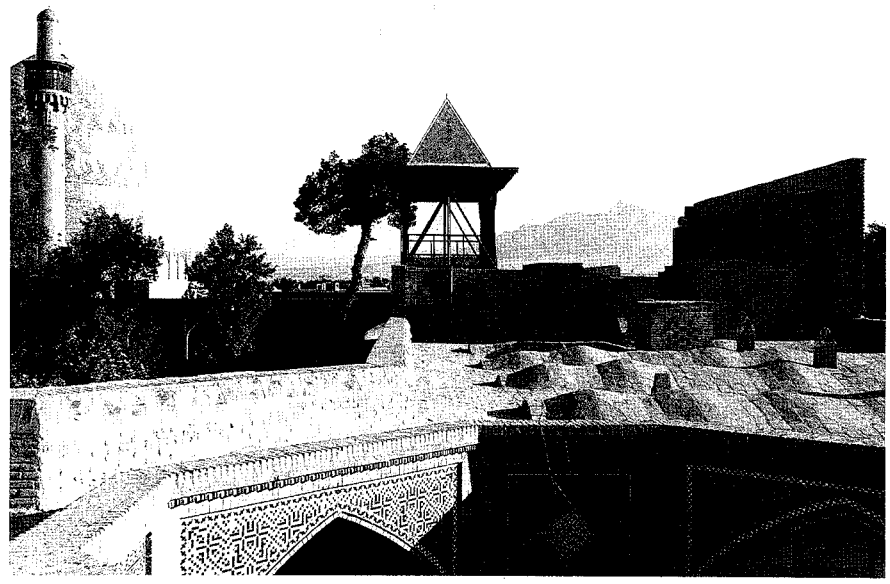


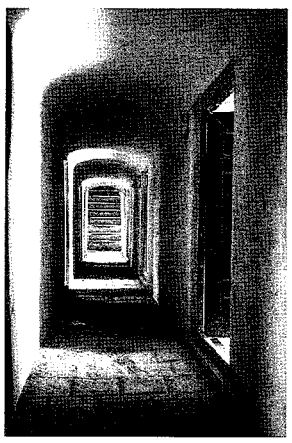
Madrasa Madir-I-Shah ("Mother of the Shah") is located among the many gardens along the Chahar Bagh in Isfahan The Madrasa Madir-I-Shah was built 1706–1714 by Shah Sultan Hussein (1694–1722) in honor of his mother This was the last of the Safavid buildings before the Afghans sacked the city in 1731

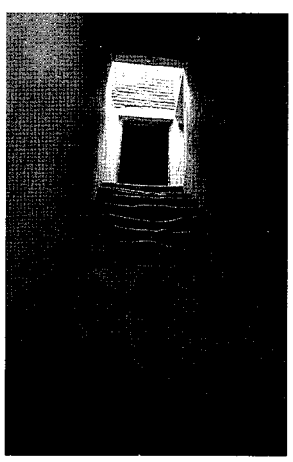
A madrasa is an Islamic college, primarily for the training of holy men *(mullas)* The only school available at that time, it was the main center for dispensing all forms of learning The income-generating stalls (known as the Bazaar-I-Boland) and caravansarai provided the funds for upkeep of the madrasa—an example of the *Waqf* in operation The caravansarai has since been converted into the Shah Abbas I Hotel.

There are only two entrances to the madrasa The four corners contain octagonal service courts which provide access to service rooms and the upper level of cells

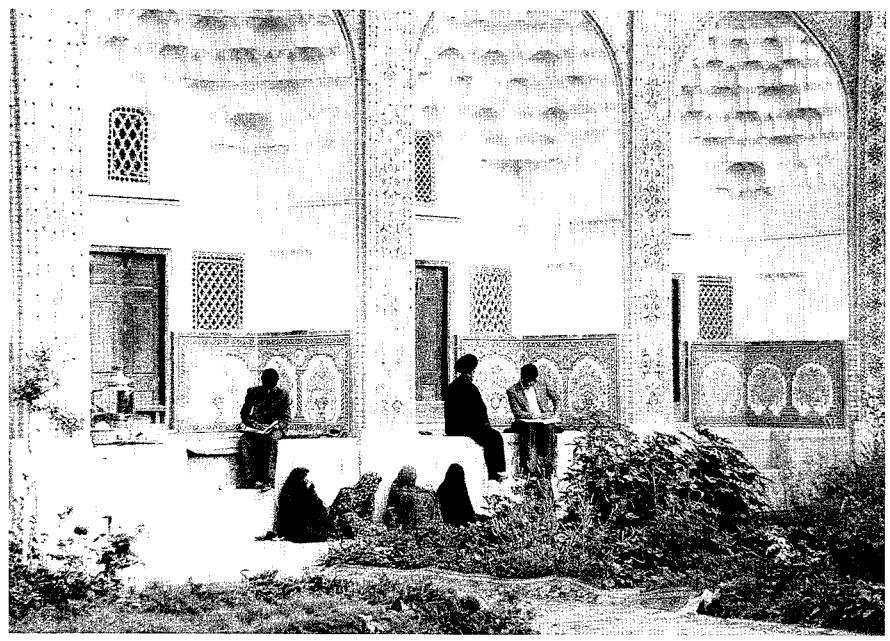
RIGHT: Roofscape of madrasa looking south from an octagonal service/access court



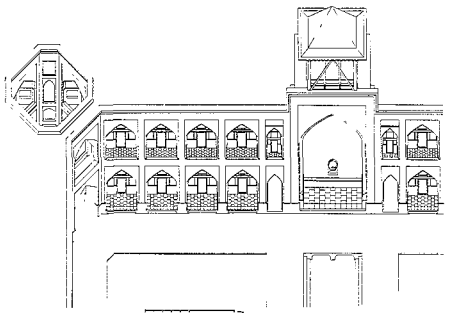




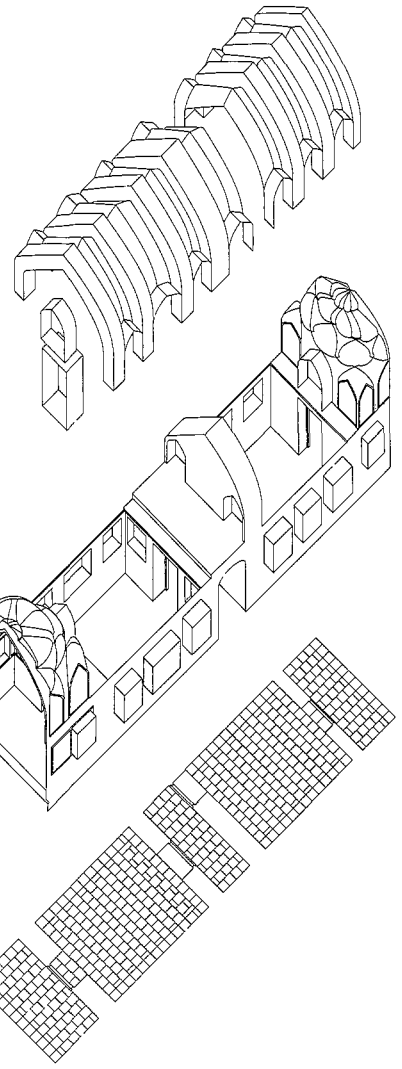
RIGHT: A typical teaching/learning situation in a madrasa in Kerman Note the relationship of those seated to the architectural elements which surround them, such as the scale of the seated human figure on the porch to the wainscotting behind This scale relationship is the same as that of the figures seated on the ground to the lower porch wall behind



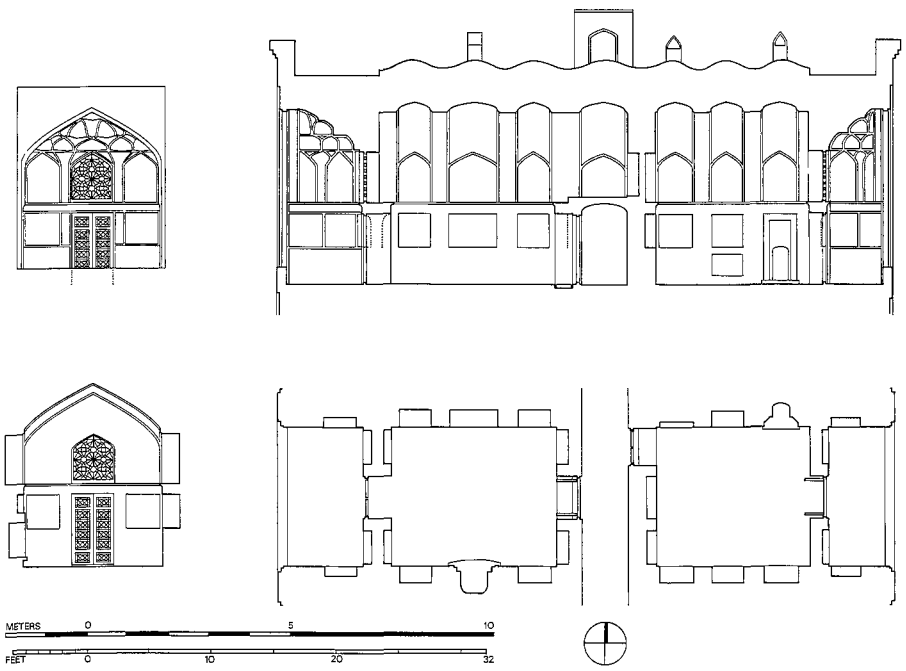
LEFT: Reading from bottom to top, the entry sequence to a typical upper floor cell on the western side of the court



RIGHT: Ninety degree axonometric of court and octagonal service court showing western part of courtyard



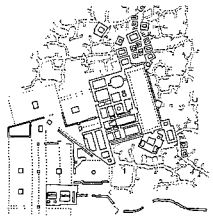
LEFT: Typical upper cell porch



LEFT: Plan and sections of upper floor cells showing a rare occurrence of the double loaded corridor The cell on the courtyard side is given more privilege Its major axis connects the entry with the porch, while its minor axis runs through the fireplace A special sleeping loft is formed by the space over the corridor The cell's orientation is toward the courtyard and it has a deeper balcony than the cells facing outside

In the recurrence and the repetition of the form of a "court" (from the Maidan to the courtyard to the cell) the idea of a fabric that is made of one cloth is reinforced

ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: Top and middle, spacial analysis of the privileged cell facing the courtyard and its neighbor facing the Chahar Bagh Bottom, the care with which privilege is indicated can be seen in the floor pattern of tiles Just after the entry to the privileged cell a band of tiles in different patterns indicate a special condition (in this case the sleeping loft above)



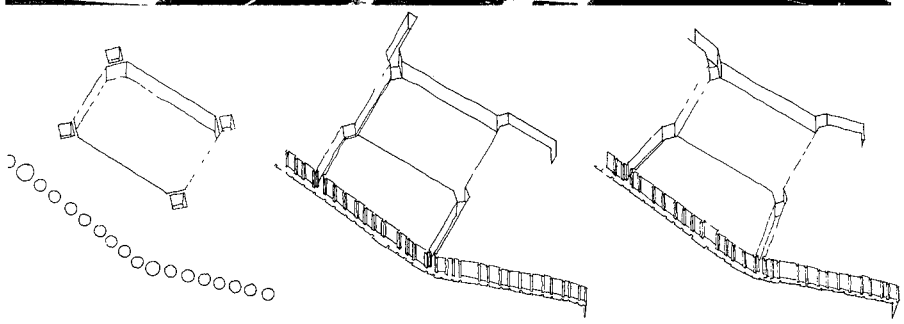
BAZAAR: CARAVANSARAI-I-GULSHAN MOSQUE-I-JARCHI

ISFAHAN

METERS 0 50

FEET 0 100

Caravansarai-I-Guishan, located on the Isfahan Bazaar, was built in the 17th century by Jarchi-Bashi, an *Emir* in the reign of Shah Abbas I (1587–1629)



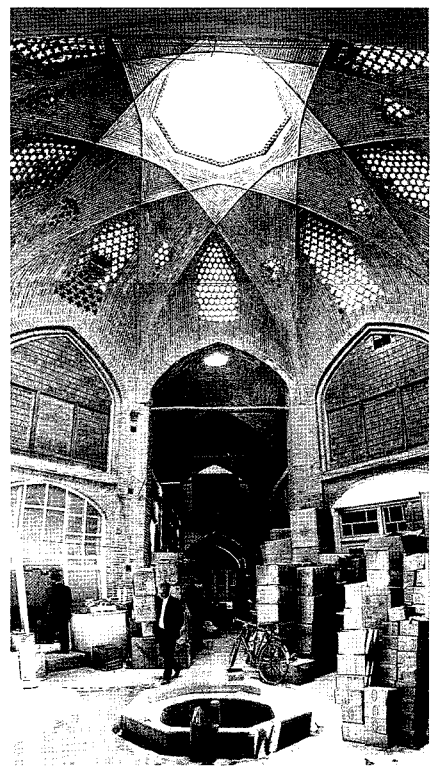
A caravansarai is a hostel for caravans and individual travelers, with provisions for trade The wholesale merchandise from outside the city is sold here to the retailers in the bazaar, thus the caravansarai acts as a "filter"

Caravansarai-I-Gulshan is located on the Isfahan Bazaar and was built in the 17th century by Jarchi-Bashi, a courtier of Shah Abbas I (1587–1629)

RIGHT: Vaulted space for selling merchandise *(Ṭimchah)*, connecting main bazaar to Haji Karim Khan Caravansarai

LEFT: Typical segment of bazaar with caravansarais and madrasas (Islamic colleges) attached to it

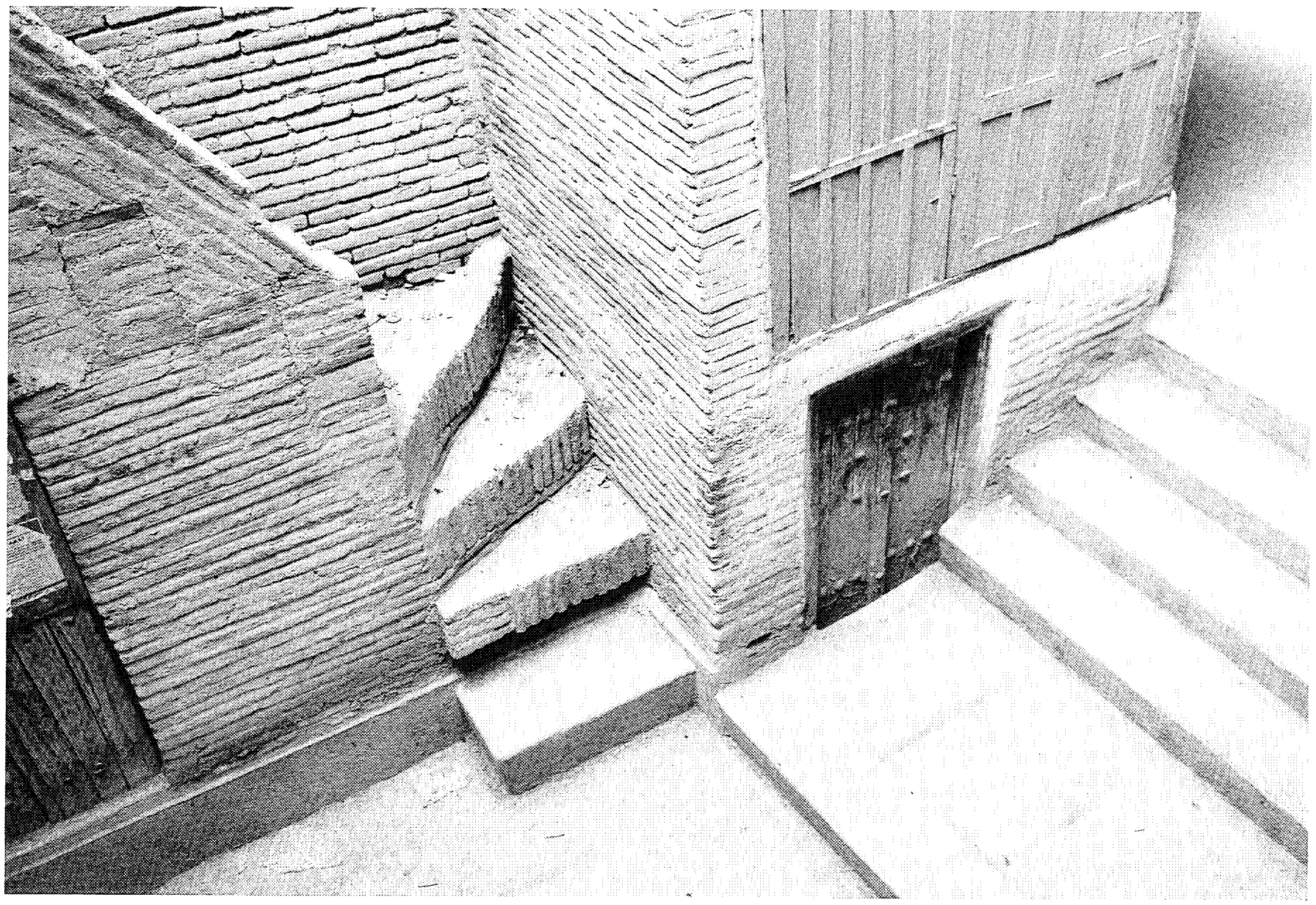
ASPECTS OF FORMAL STRUCTURE:
FROM LEFT TO RIGHT: First, the typical relation of a caravansarai (such as Gulshan) to the bazaar The caravansarai has a pure courtyard against the winding bazaar Second, the connecting corridors between the caravansarai and the bazaar are usually parallel to the sides of the court and function as "mini-bazaars" Third, alternate connections The presence of small mediating spaces off the corners of the courtyard enable shifts in orientation These spaces are placed at 45 degrees to the two axes of the courtyard



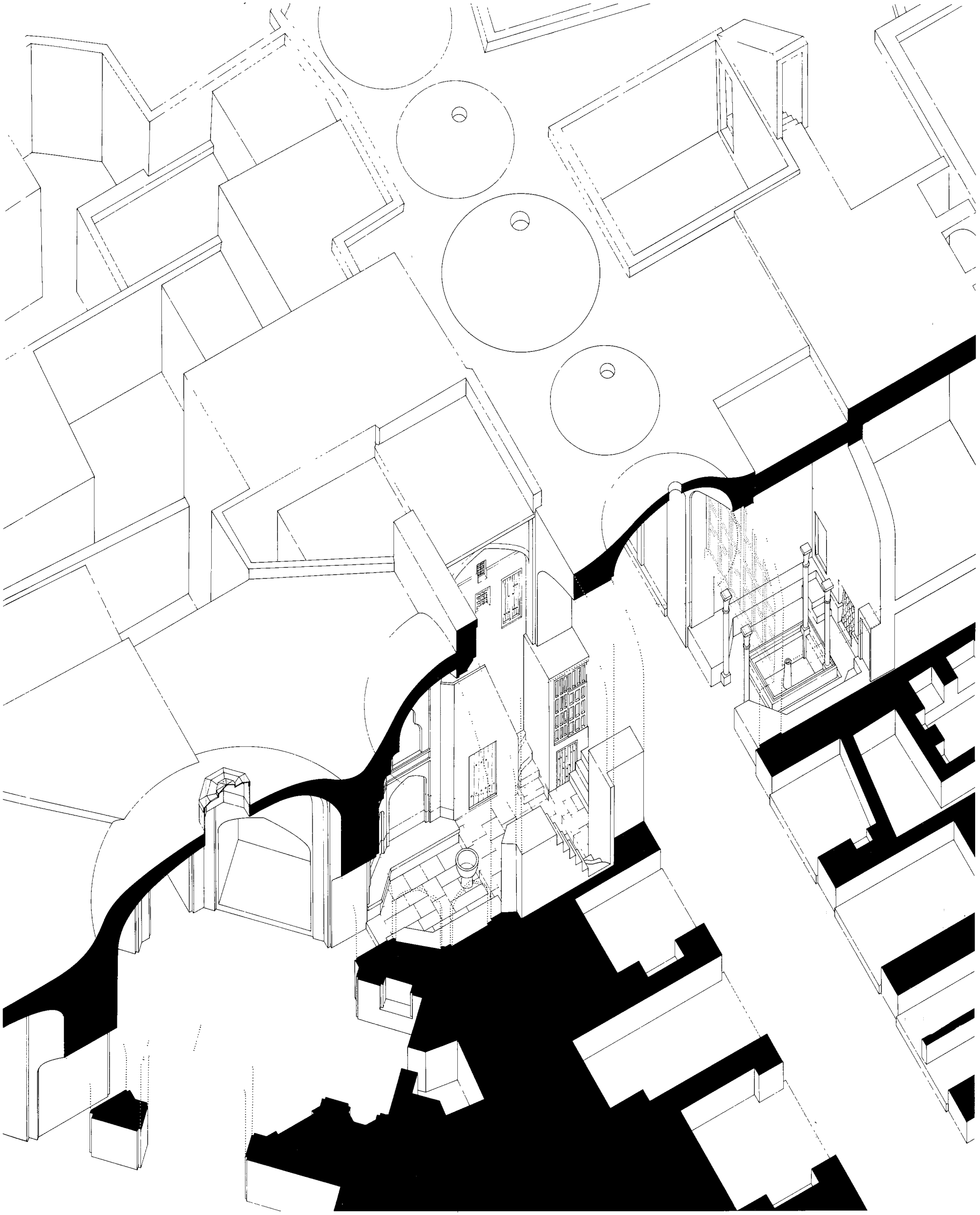
RIGHT: Typical interior segment of main bazaar, showing the textile section

LEFT: A typical "planned" bazaar (far left) on a Friday; the enclosing structure is built first A typical "ad-hoc" bazaar; commercial and private buildings are built along a street by accretion, with the structures providing shade erected as needed

ASPECTS OF FORMAL STRUCTURE:
FROM LEFT TO RIGHT: A typical "ad-hoc" bazaar and a typical "planned" bazaar While the space of the first bazaar is irregular in all directions, the second is characterized by domed structural bays which are rhythmically organized



Stairs descending from bazaar (right) and keeper's apartment (left) into courtyard in front of Mosque-I-Jarchi



Cut axonometric through sequence of spaces from mosque to fountain

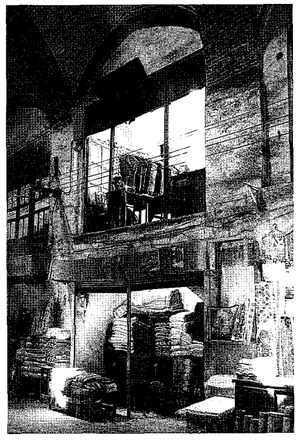
BAZAAR: AMENITY

ISFAHAN

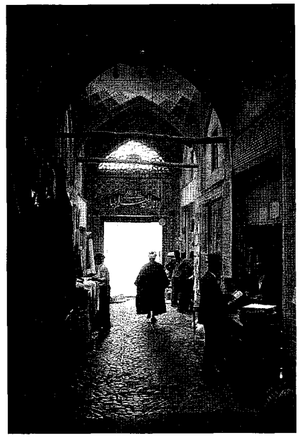
The Isfahan bazaar is the commercial "backbone" of the city Because of its pleasant micro-climate all year round, the bazaar is also used as the city's "Main Street": meeting people, seeing and being seen

The pious institution of *Waqf* endows, not only mosques and other religious buildings with the income of donated bazaar stalls, but also maintains public fountains and hygenic amenities The fountain across from the Jarchi Mosque is a good example of this principle at work

Plan and east-west section through Caravansarai-I-Gulshan, a public rest place with a fountain, the main bazaar, the entry to the Mosque-I-Jarchi and the mosque itself



ABOVE: Typical bay of main bazaar with vending stall below, lit by the oculus of the dome, and the workroom above, lit by a window in the wall The difference in character of the lighting reinforces the impression that the lower floor is dug out like a cave while the upper floor is open to the bazaar as well as the outside The interior bays dictate the rhythm, and all kinds of conditions can occur adjacent to the bazaar



ABOVE: Connection from main bazaar to Caravansarai-I-Gulshan allows for development of a mini-bazaar

ASPECTS OF FORMAL STRUCTURE:
The axial relationship between the public rest place with fountain and the mosque entrance is qualified by a number of formal, experiential and implicitly cultural characteristics, explicated in two diagrams (right)

1 Even though both the mosque and fountain are pious institutions *Waqf* one larger than the other, their relationship to one another is not obvious because the bazaar dominates the entire spatial experience This condition existed at the time when the mosque was first built

2 With the later physical connection of *mosque iwan* to bazaar, a spatial continuity between mosque door and rear wall of fountain room is created (marked by an inclined plane symbolizing, with its fish scale surface, a small waterfall)

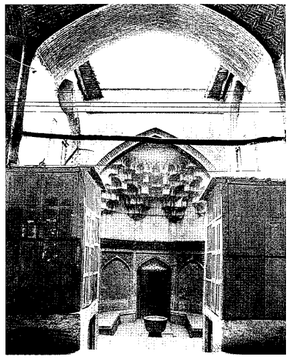
3 There is a contrast between the relative formality of *mosque iwan* (form and decoration) and fountain place (form and fine sculptural treatment of its principal elements: waterfall plane, fountain, columns) and the pair of connecting stair walls, inserted in a vernacular manner This contrast helps to maintain the original face-to-face relationship intact while adding a new element: a well-defined forecourt to the mosque, open to the sky

4 The illusionary disappearance of the otherwise dominant bazaar-corridor, when viewed along the fountain-mosque axis, is in large measure due to the fundamental imbalance of the two spaces off the bazaar It is a subtly calculated imbalance, achieved by the orchestration of formal and experiential elements in a way that the axial relationship acquires a clear thrust from waterfall plane to mosque door The spaces "telescope" from low, closed, cool, dark, and grotto-like to high, roofless, warm and light-flooded; two columns "jump" forward out of the pool as the stairs ascend toward the arch of the *iwan*, toward even more light

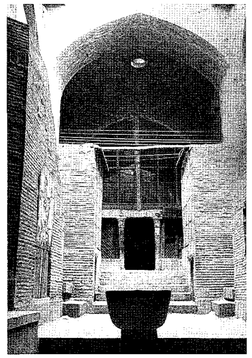
5 Fountain room and mosque entry thus become one coherent whole The domed bay of the bazaar which connects them also separates them as one moves through the bazaar

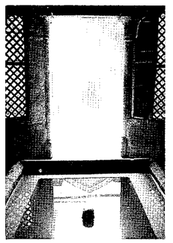
BELOW: Visual sequence from fountain to mosque

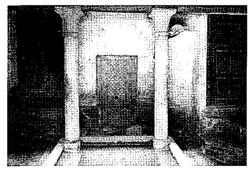
BELOW: Shadowy bazaar space intersecting the light-filled space of the mosque-fountain dialogue

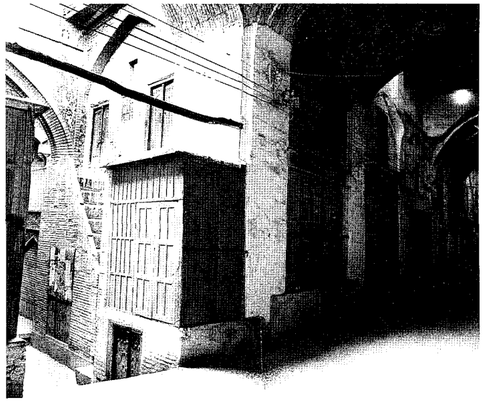


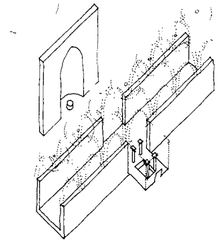
BELOW: Visual sequence from mosque to fountain The bazaar, which runs transverse to the mosque-fountain axis, seems negated

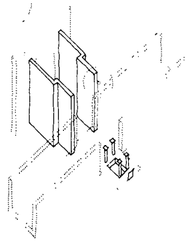






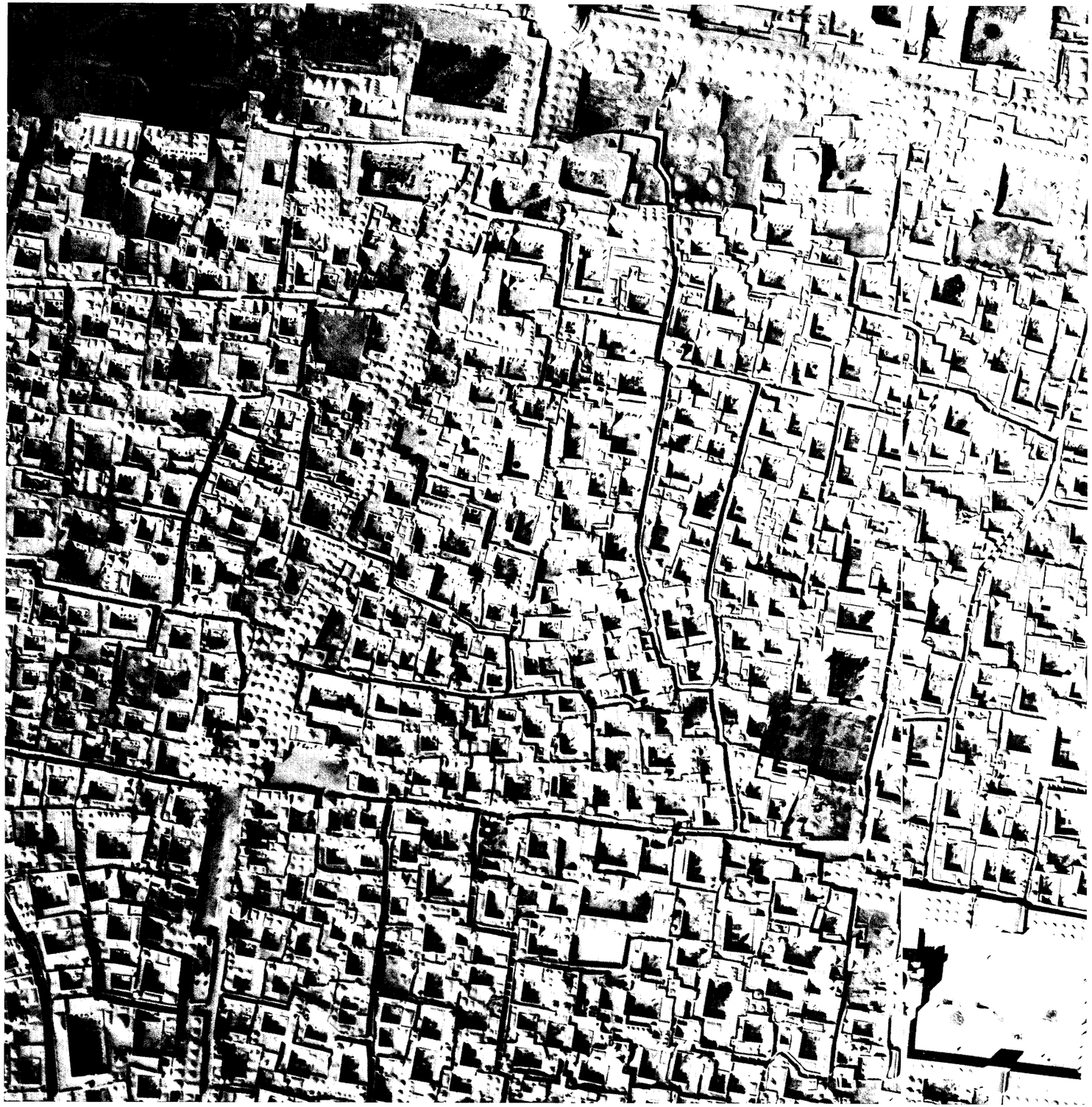






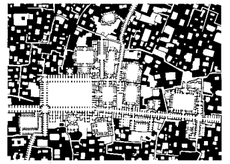
KERMAN

IRAN



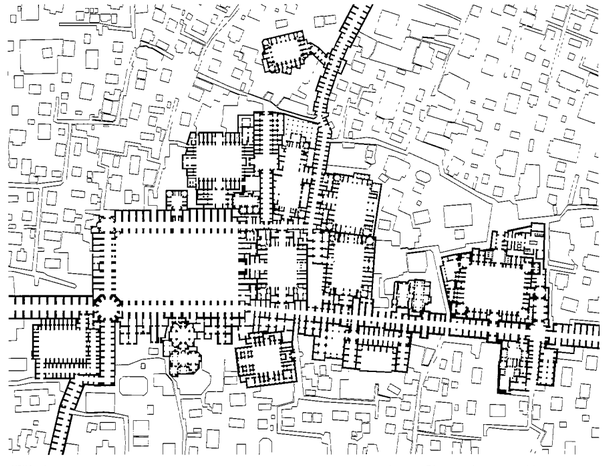
Kerman is the most remote of Iranian cities in the chain of cities cutting through the central plateau In the east it is separated by the Kavir Desert from Baluchistan, now modern Afghanistan and Pakistan The city owed its modest prosperity in Timurid and Safavid times to trade with India During the Safavid period it was also an important city on the route to a Persian Gulf port revitalized by Shah Abbas I (1587–1629)

LEFT: Aerial photograph showing city fabric of Kerman south of the main bazaar (top of photograph) Although the city fabric is made of bazaars, baths, mosques, other public and private buildings, courtyards large and small, and paths, it appears homogeneous from the air In this uniform fabric, paths resemble fault lines (The two red parallel lines represent the current 82-foot-wide highway cut in the 1960s)



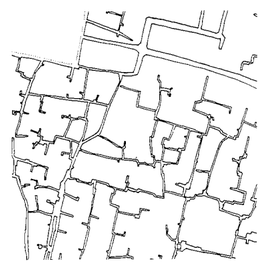
LEFT: Nolli-type plan reveals the extent and the figural quality of the ensemble of public buildings and thus the realm of public activity

ABOVE: Figure/ground plan does the opposite by equalizing public and private structures The *umma* becomes apparent, the individual and the community are merged



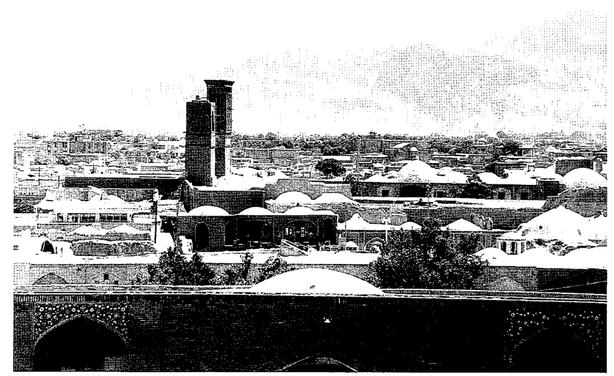
ABOVE: Plan emphasizing public structures

BOTTOM: Roofscape of Kerman looking east toward the mountains In the middle ground are two of the tallest wind towers (*bad-ghir*) in Iran



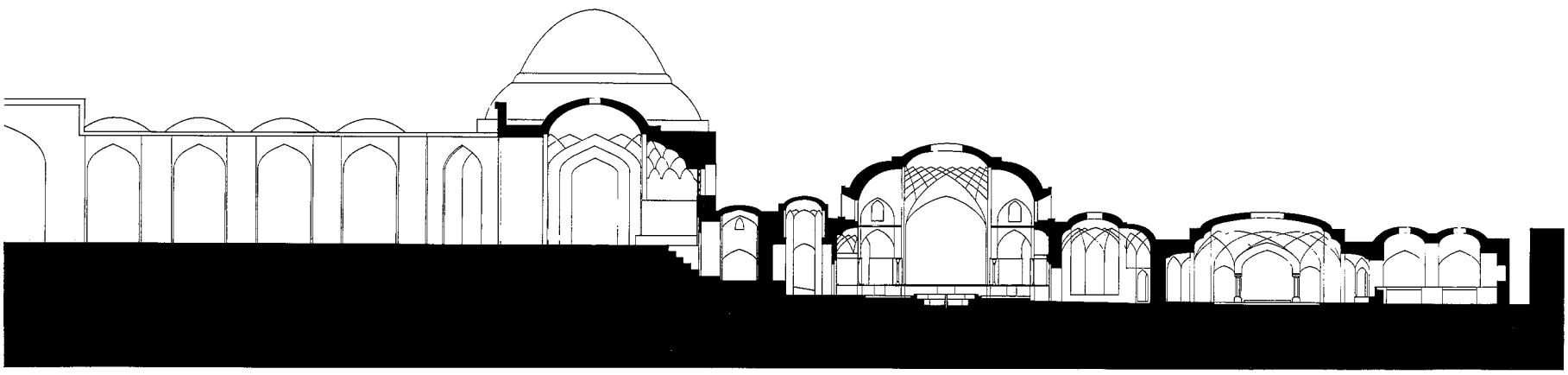
ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: Three fundamental layers of spaces and activity make up the Islamic city in Iran First, above the datum plane of the roofs, the sculptural objects (domes, wind towers, etc)

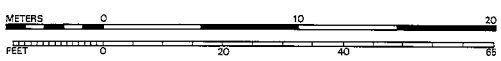
Second, below that datum, courtyards of every kind and size, third, spaces on the ground usually denoting circulation



HAMMAM GANJ-I-ALI KHAN

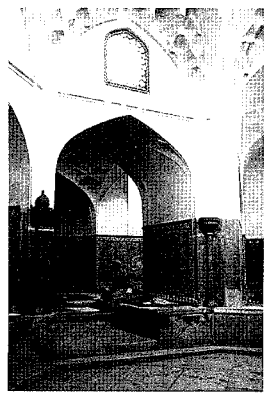
KERMAN



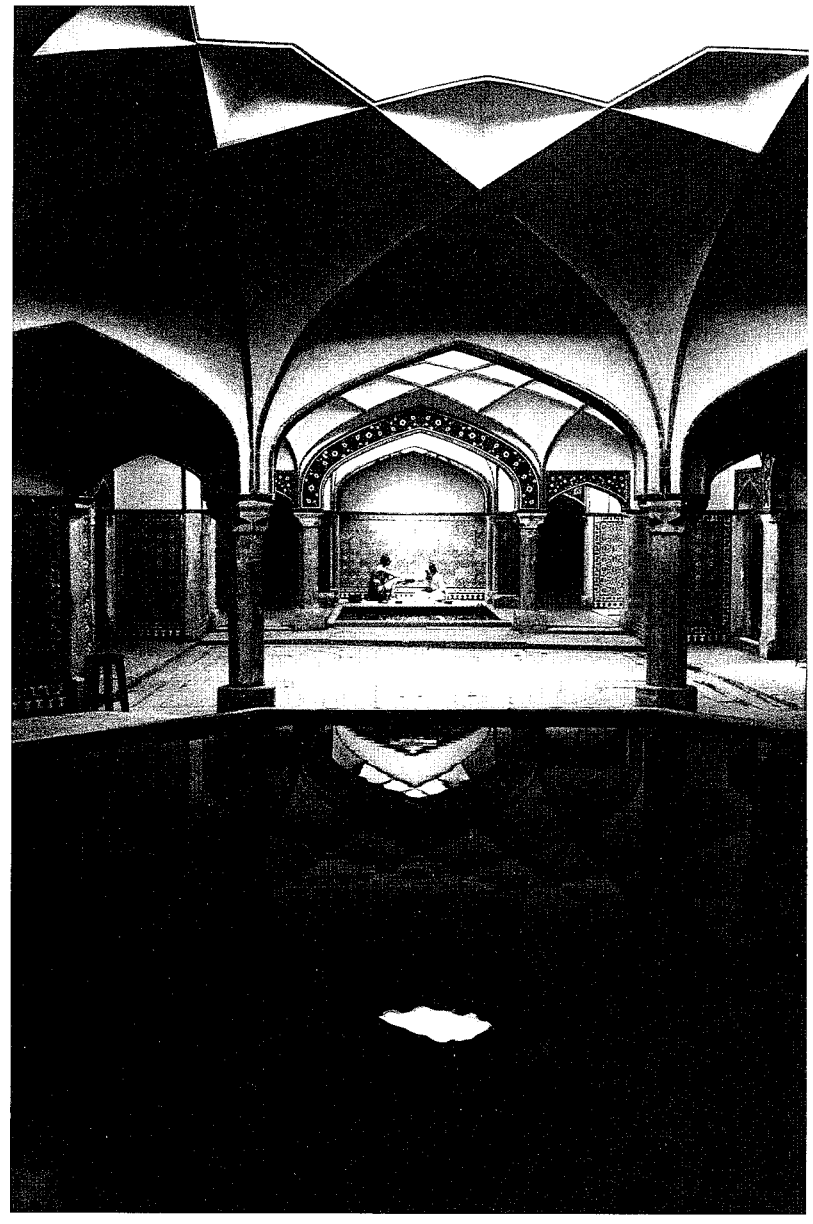


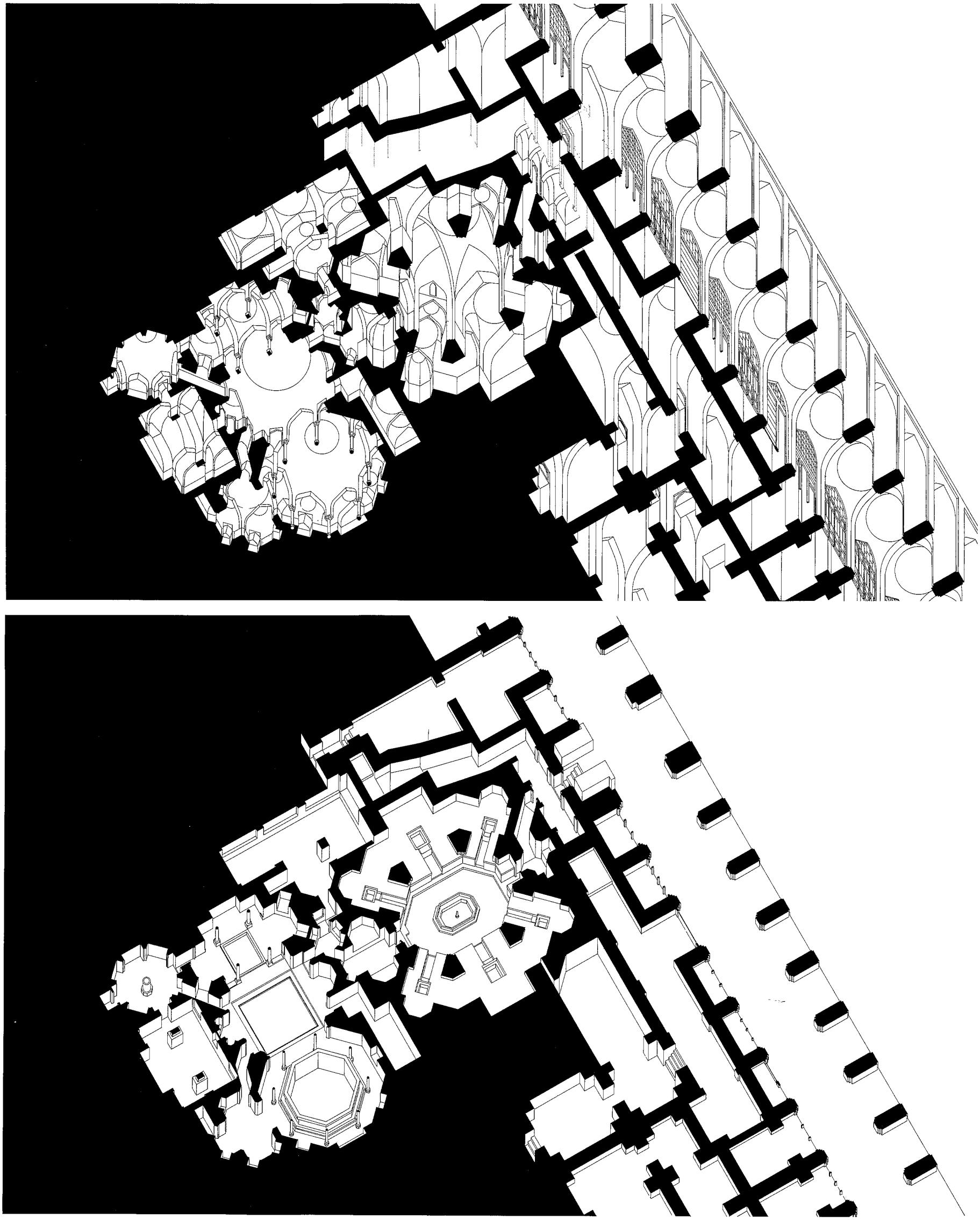
North-south section of the Hammam, cutting through the bazaar entry, through the disrobing room, the cold room, the warm room, and the water reservoir with heating chambers for the hot room beyond Men and women are scheduled at different times for bathing

Hammam Ganj-I-Ali Khan, a public bath house located on the main bazaar in Kerman, was built in the 17th century The bathhouse, beyond its customary hygienic function, is also used as a place for social contact and business The Roman bath is its antecedent

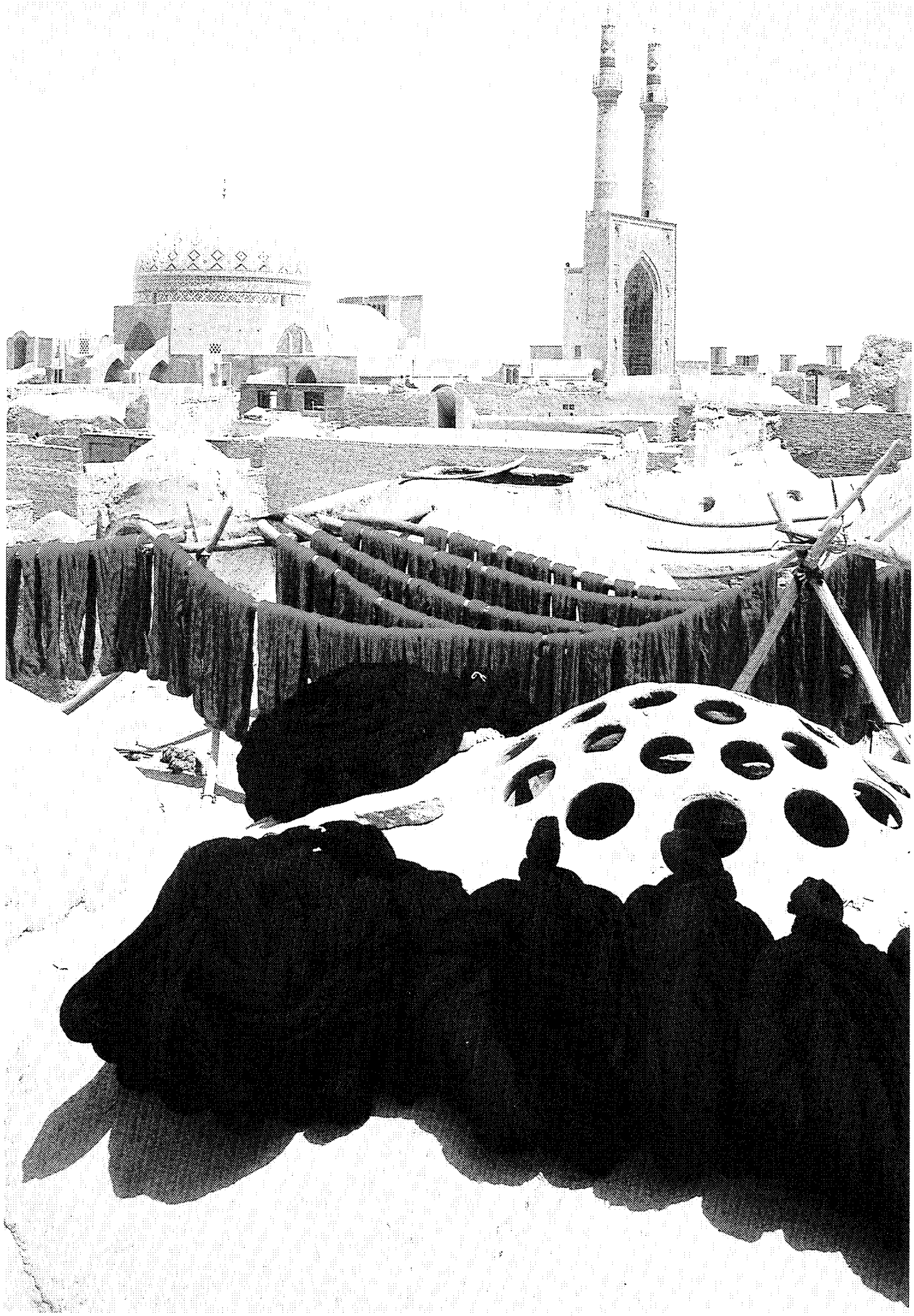


ABOVE: Sequence from bazaar to entry of bath to disrobing room to warm room

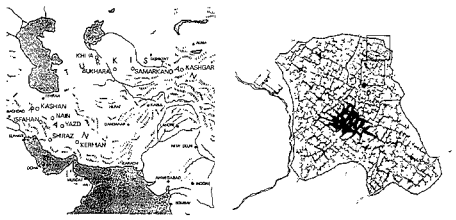




Choisy-type axonometric, top, plan axonometric, above



Yazd, roofscape over bazaar looking toward the Friday Mosque The wool strung up to dry comes from the dye works below the perforated dome



TWO HOUSES

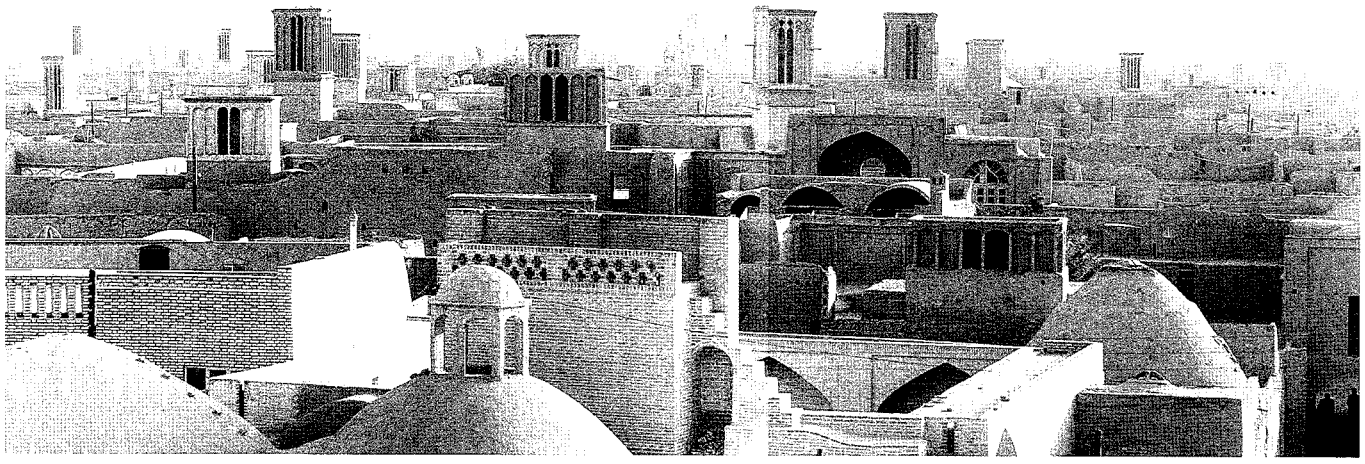
YAZD

The city of Yazd has one of the most extreme climates in Iran In the summer it can reach 34 degrees centigrade in July, while it can plummet to below freezing in the winter The climate naturally affects the way the houses are built Traditionally, the citizens of Yazd leave the hot and dusty city in the summer and resort to the mountain ranges in the north and the south Two major Iranian deserts, Dasht-E-Kavir and Dasht-E-Lut, converge near the city

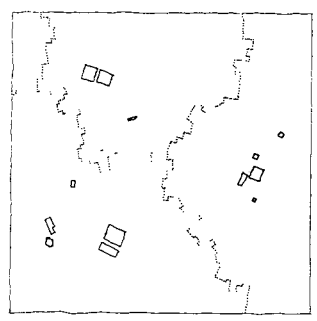
Yazd formed a major cross-roads between two important trade routes: one from the Mediterranean to India, the other from Arabia to China The Arab influence manifests itself in the typical Yazd house which locally is called "Arab" house

RIGHT: Roofscape looking in the general direction of House I and House II from the roof of the Friday Mosque Sand dunes and mountains are visible in the distance Focusing more closely on the city fabric, several characteristics of the Islamic city emerge The different levels of the city—street, court, balcony, roof—become ambiguous The roof turns into a surface, as active as any on the ground The tenuous relationship of levels animates the fabric of the city just as the roofscape animates the horizon with its domes, balustrades, wind towers *(bad-ghir)*, and steps The elements give rise to a stage set effect which invites exploration Note that the true ground plane appears at lower right where the figures are walking Yet even here the street is not merely a street but a tunnel below other buildings

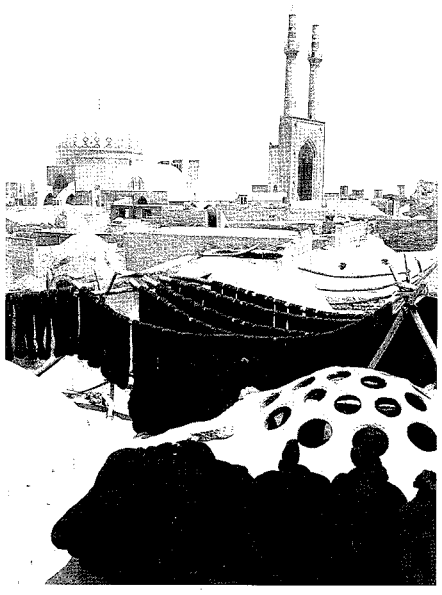
Ambiguity of use is further enhanced by uniformity of appearance The unity of the city fabric is reinforced by the use of clay as a principal building material Visually, there are no clues which separate lots The lack of distinct property lines also reinforces the feeling of unity



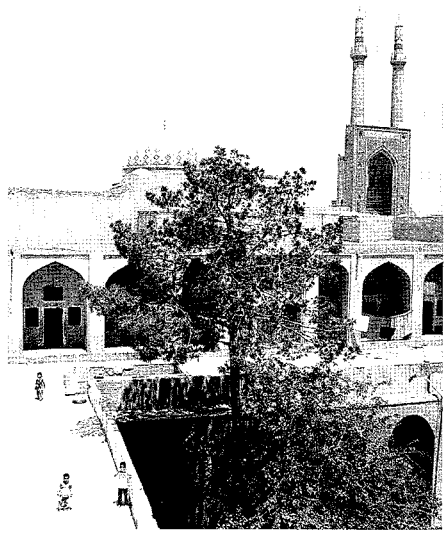
ASPECTS OF FORMAL STRUCTURE:
Interlocking progression from individual house, to neighbor groups sharing same cul-de-sac access, to neighborhoods sharing public amenities (mosque/school, bath, washing house)



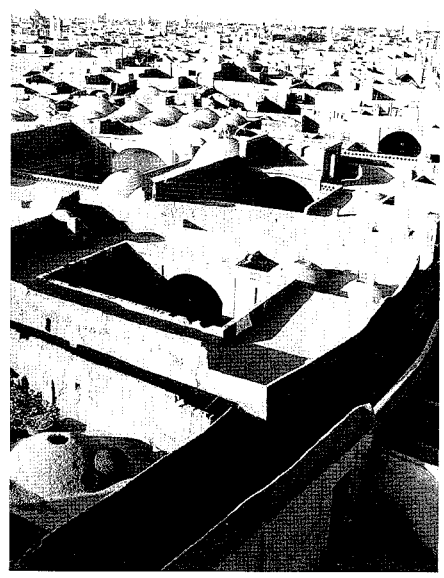
BELOW: Looking at the Friday Mosque from the bazaar roof The roof is an accessible and commonly used space Here it is used as a place to dry freshly dyed yarn The holes in the domes of the bazaar are for ventilating the dyeworks below



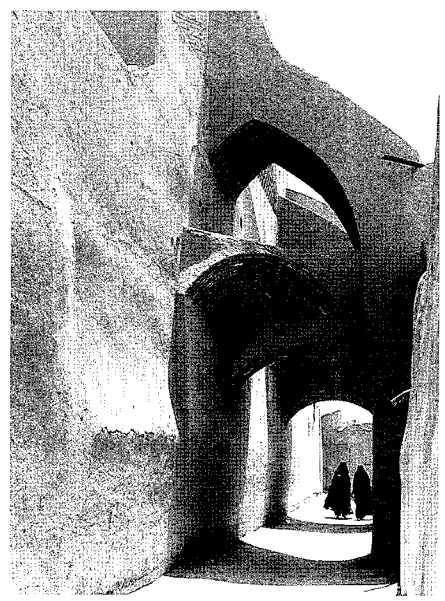
BELOW: Children's Hospital near the Friday Mosque The ambiguity of levels is again apparent The hospital resembles a large house with a sunken court where the family retreats in hot weather The Friday Mosque entrance *iwan*, beyond, is one of the tallest in Iran Its exaggerated height resembles the prow of a ship, acting as a reference point in the uniform city fabric

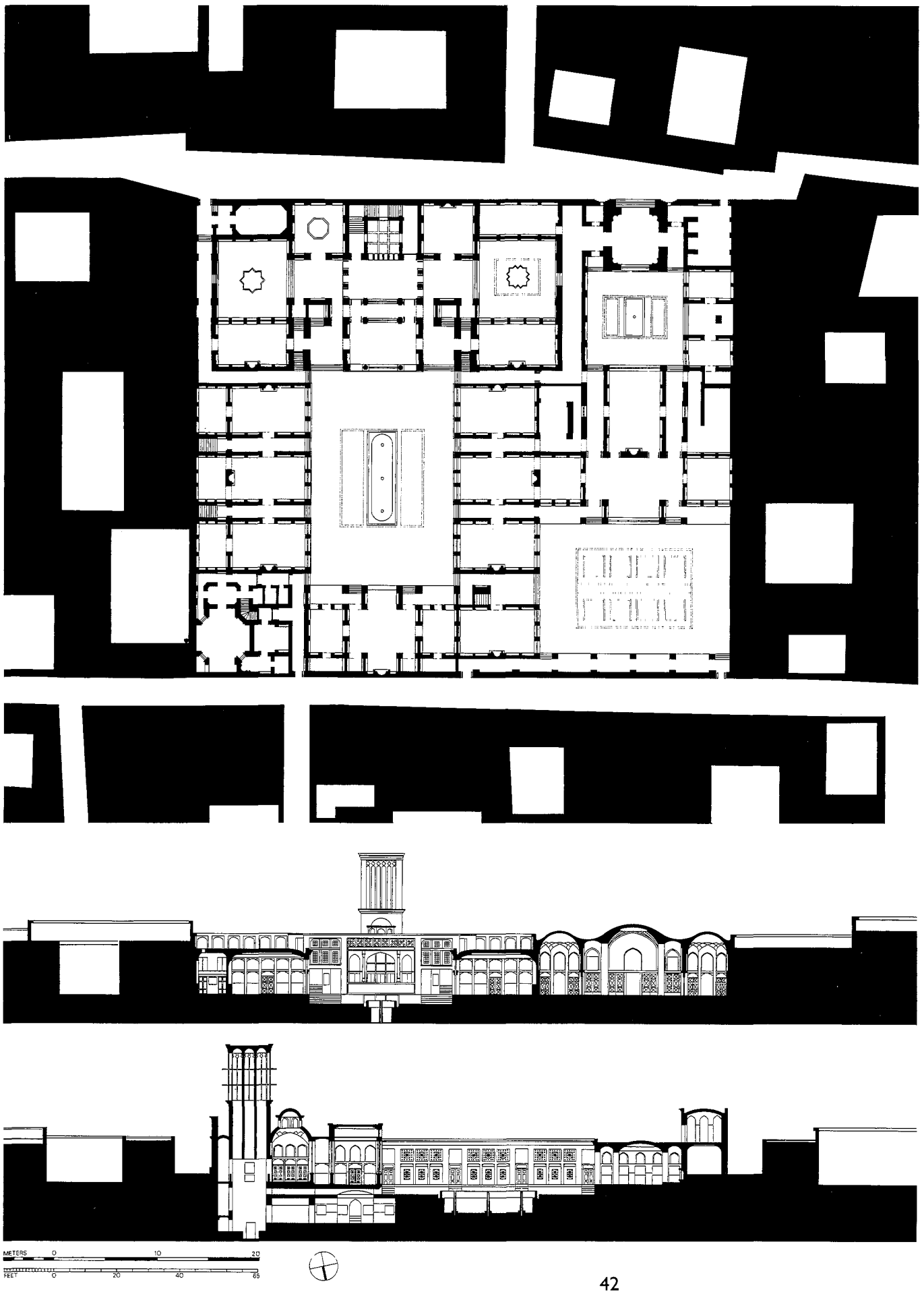


BELOW: Roofscape from the Friday Mosque looking west, showing typical house courts embedded in the city fabric While on an urban scale, the street appears as if carved out of a mass, in reality the wall defining it is a thin membrane at the building scale The narrowness of the streets provides shade from sun and protection from dusty winds



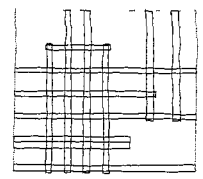
BELOW: A narrow street near the Friday Mosque The wall to the left is the Mihrab Wall facing Mecca, but such a distinguished function is not signaled on the exterior It is totally anonymous to the passer-by The buttresses placed here seem to hold up the wall itself Their true function—holding up the dome of the mosque—is hidden from the outside

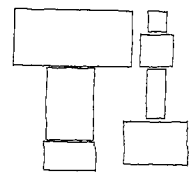


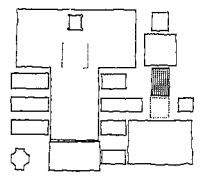


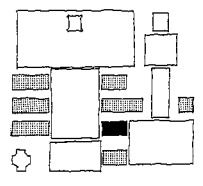
The Razvian House (House I), located at the northern edge of Yazd, was built in the 1880s (Quajar Dynasty) It was destroyed some time after 1925 when it was documented by Professor Pirnia These drawings are based on his measurements Its unusually gridded internal planning makes this house especially compelling House I is the most formal of all the "Arab" houses presented here

PLAN OF HOUSE I The formal entry is at the western end of the southern perimeter It looks out on its own court on axis but leads to a corridor on the east The Islamic house is zoned according to certain traditions On axis moving north from the entry are the guest quarters, with their own court The area to the east of the entry is the women's quarters *(anderuni)* with two small, symmetrical courts This area also holds the summer quarters characterized by a spacious porch or *talar* The women's quarters constitute virtually a house by themselves Opposite, across the large men's court *(beiruni)* are the winter quarters and to its east the kitchen and latrines All other rooms are for miscellaneous purposes The figural qualities of the plan are represented on the facade of the *talar* and the wind tower behind it





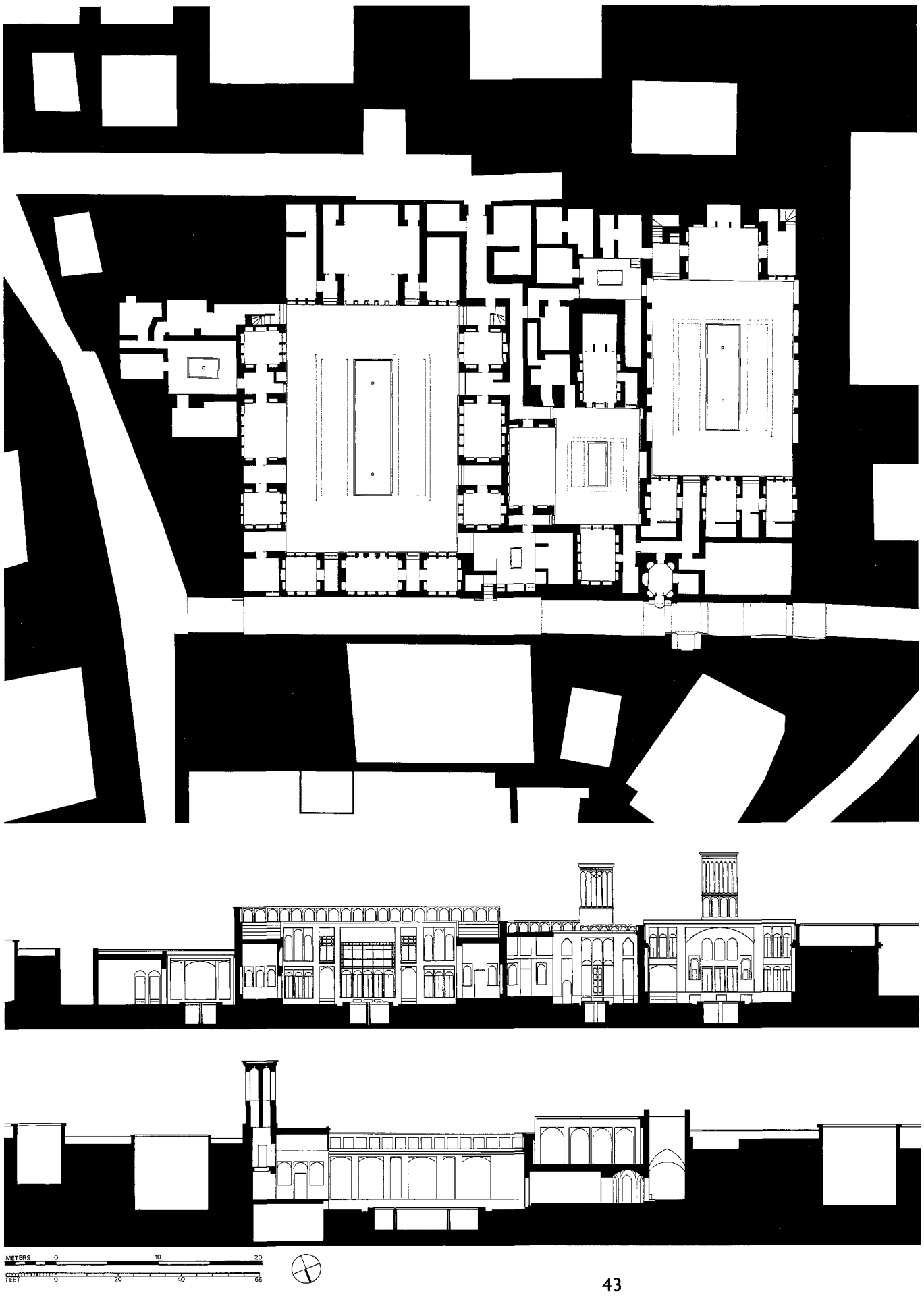




ASPECTS OF FORMAL STRUCTURE:
From top to bottom: spatial and constructional tartan grid is contrasted with principal and secondary plan "figures" which denote analogous use differentiation The lower diagrams emphasize two scenarios, respectively: Opposition of summer to winter quarters, and connection of two major courts by a double-faced room This room is singularly capable of accomodating honored guests and "fringe" relatives

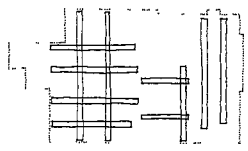
LEFT ABOVE: East-west section looking south from center of main court The underground apartments are used during the hottest days because they are provided with a complex ventilation system involving a wind tower, a pool in the courtyard and an underground pool

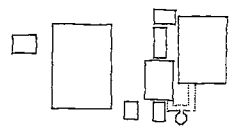
BOTTOM: North-south section through center of main court

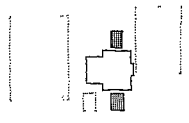


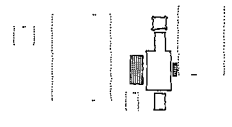
The Talaie House (House II) in Yazd was built in the late 18th-early 19th century House II is similar to House I in that its living quarters are organized around courts, yet its plan is less rigid Formal entry through the *hashti* (eight-sided entry room) on the northwest side leads to the women's quarters with a court to the right and the guest quarters with a smaller court to the left The largest court organizes the main living spaces: The summer quarters with the *talar* are to the north and the winter quarters are to the south The kitchen, further to the east, is separated from the main body of the house Through the use of wind towers and basement rooms a microclimate is created which modifies the extreme conditions of the summer heat

The looser plan of House II adapts more easily to the city fabric Unlike House I which is a closed system, formally complete in its distribution of rooms and therefore difficult to add to, House II is a more open system and lends itself to the addition of spaces Materials for both houses are baked brick and adobe Wood is a precious material and is used sparingly





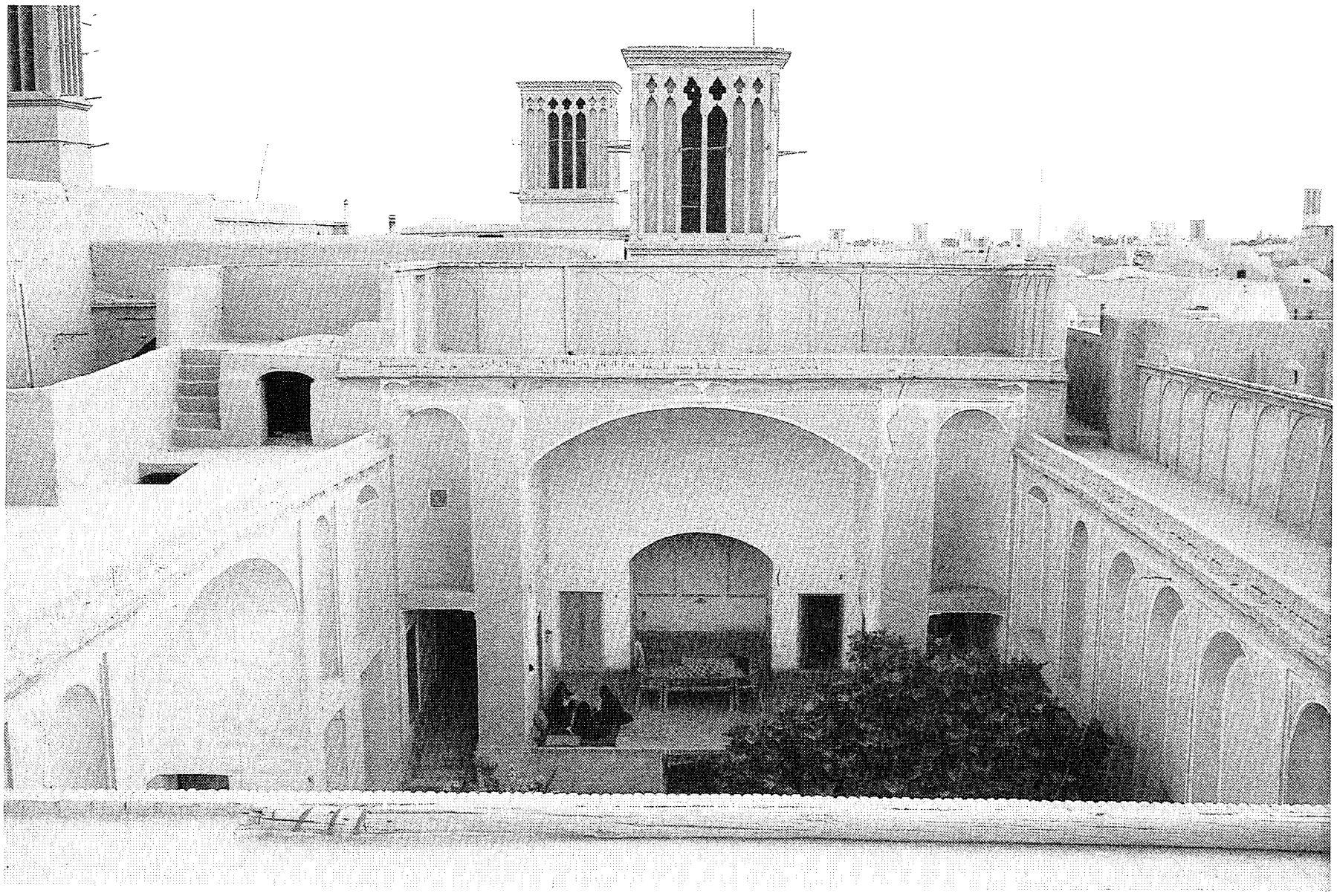




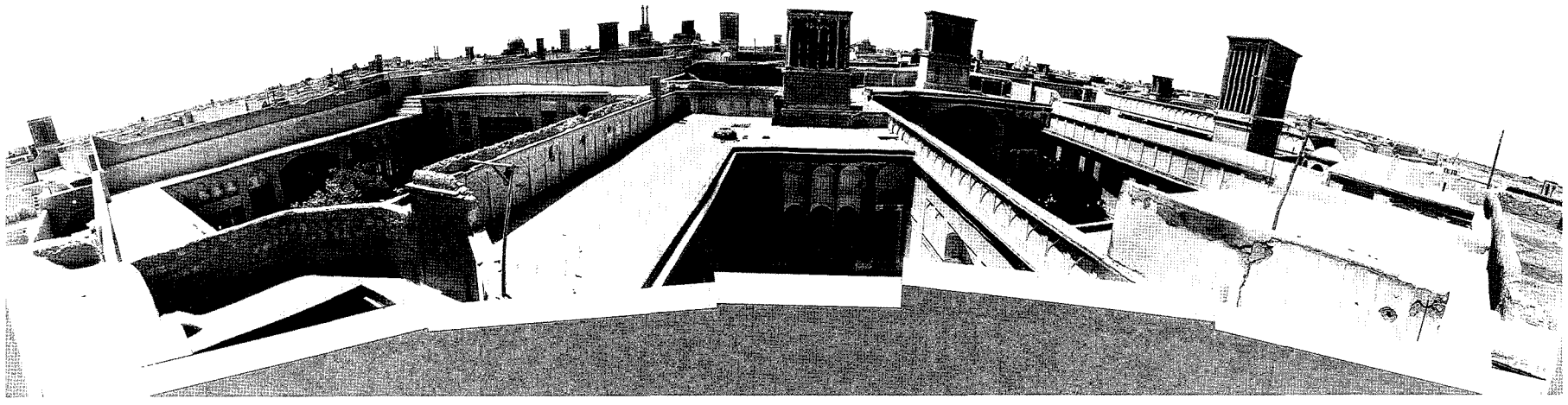
ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: Unlike in House I, one "tartan" grid does not lace all spaces and volumes together Instead there are three different tartans, each corresponding to a major courtyard Similarly the plan (zoning) "figures" are less interdependent In the lower two diagrams, a third open space (rather than a room as in House I) links the two dominant courts because of the strength of its east-west axis It is meant for guests or distinguished visiting relatives The court also has the usual north-south axis with a wind tower anchoring its southern end

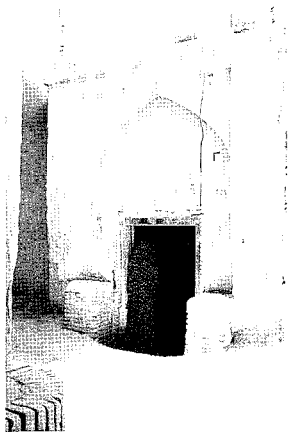
LEFT TOP: East-west section through house looking south

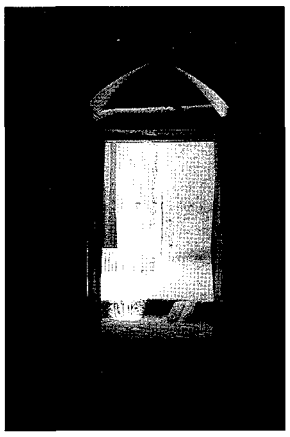
LEFT BOTTOM: North-south section through the western court showing the wind tower Both sections show underground rooms which stay cool during the hottest days

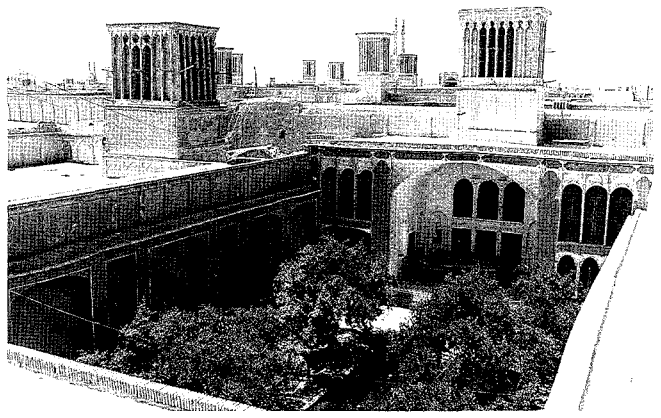


Yazd, typical house courtyard with talar (porch), bad-ghir (wind tower), and double-sunken center court where trees grow around a pool, all contributing to a comfortable micro-climate





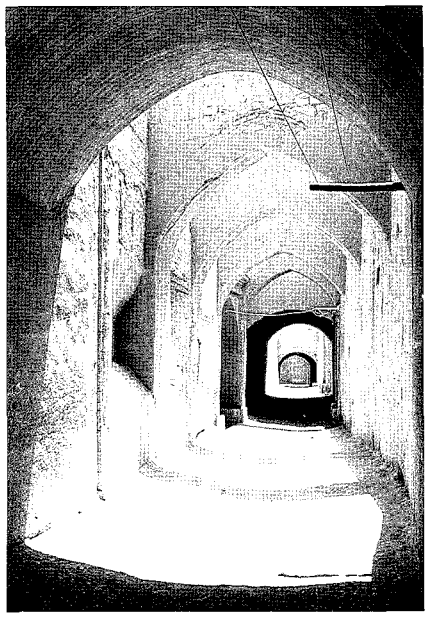




ABOVE: One-hundred-eighty-degree panorama from east to west, facing southwest Each major court is relatively independent It is therefore possible to easily acquire new property or sell it

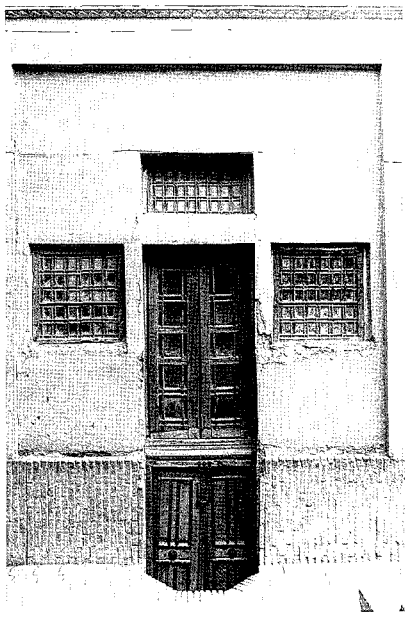
FAR LEFT: Main entrance to House II from entrance of neighboring house (left) and from *hashti* out to alley (right)

LEFT: Western court of House II The raised wooden platform is for social gatherings in the *talar* and in the upper balcony level between the wind tower and the rear wall of the *talar*



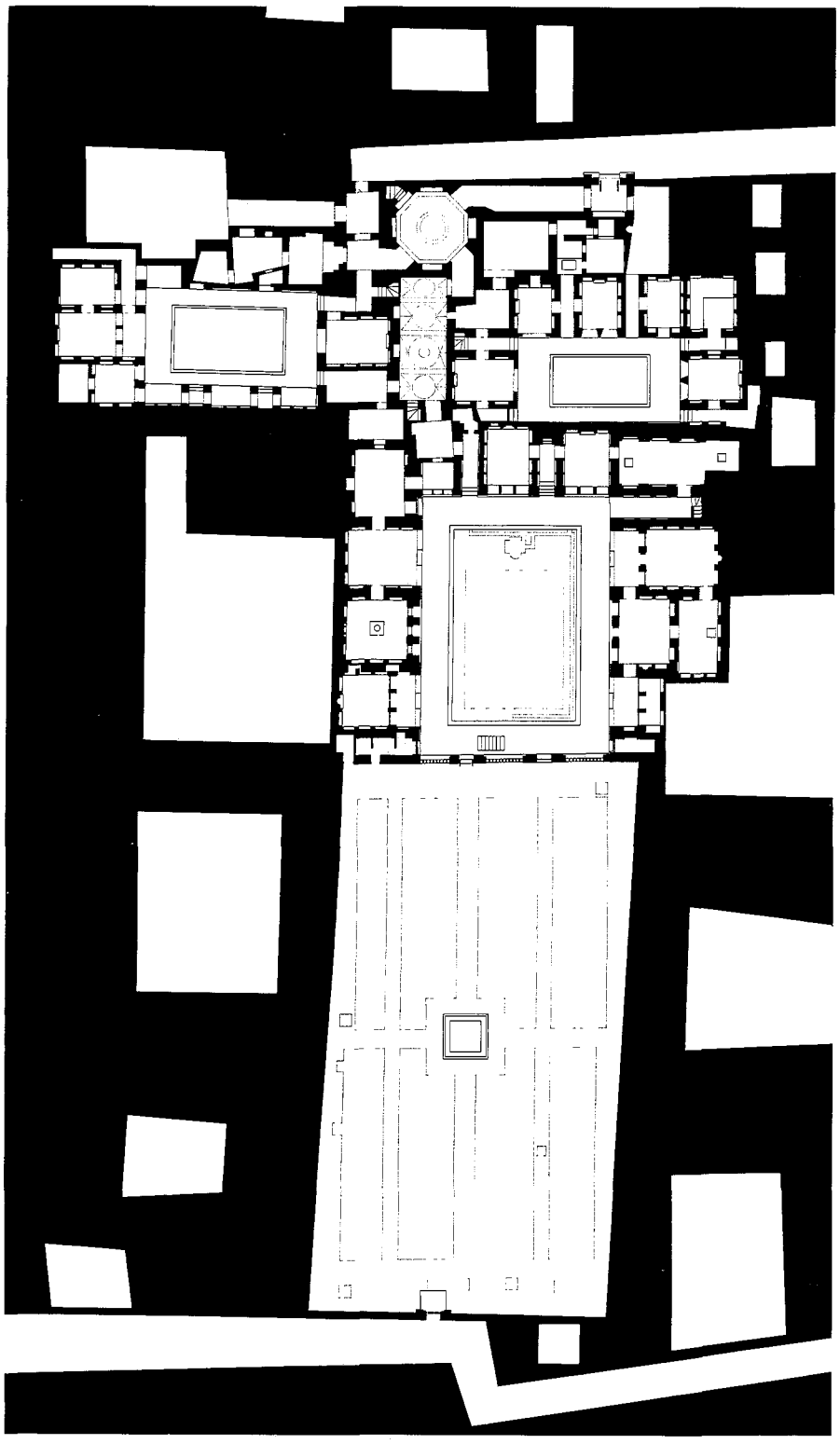
LEFT: Street from the west to House II on the right The arches supporting the two neighboring houses create a rhythm which unifies the narrow street, turning it into an independent element

RIGHT: Detail of a courtyard facade from a similar 18th century house in Yazd The interlocking pinwheel lattice of the window shows the extreme care with which precious wood is handled and displayed In the shallow plane of the window the lattice gives a feeling of depth and three-dimensionality



HOUSE WITH GARDEN

NAYIN

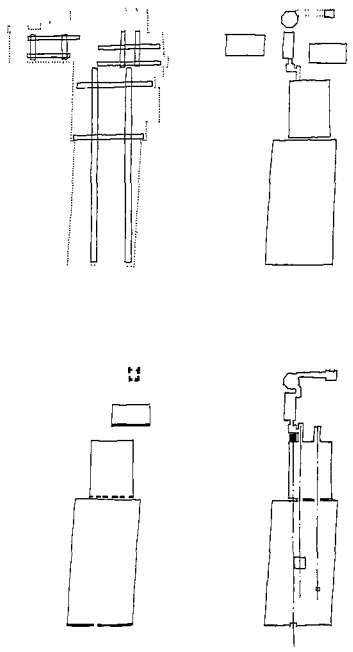


This house in Nayin, a provincial town between Isfahan and Kashan, was built in the late 18th century Its relationship to a large garden is unusual in that the garden extends beyond the confines of the house

Plan of house with a garden The entry is not directly from the street into the *hashti*, but follows a neutral corridor This is a typical trait of Iranian architecture and planning: It is more important to be in a place than to get to it The western ideals of procession and entry are not relevant, while the specialness of the room itself is In this house there are casual connections between well-defined spaces From the *hashti* one may go off in one direction to the southwest toward the kitchen and servants' quarters or choose another path which winds its way to the large sunken court of the main quarters The women's quarters surround a smaller court near the entry, hidden from view Facing each other from either side of the large court are the summer quarters on the southwest and the winter quarters on the northeast A screen wall on the southeast encloses the large court and places it within the boundary of the house proper Beyond this wall is a large garden with a small door at the far wall leading to the alley beyond Comparing House I and House II, one can discern the vestiges of a tartan grid which determines the corridor and room system

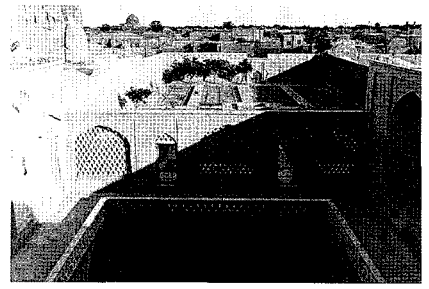
RIGHT: Upper court and lower court separated by a screenwall from large enclosed garden The ancient fortress *(aro)* of Nayin is to the top left

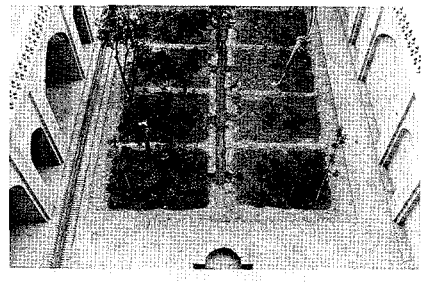
MIDDLE RIGHT: The dome of the entry *hashti* with stuccowork pattern *(muqarnas)*, in the process of meticulous restoration

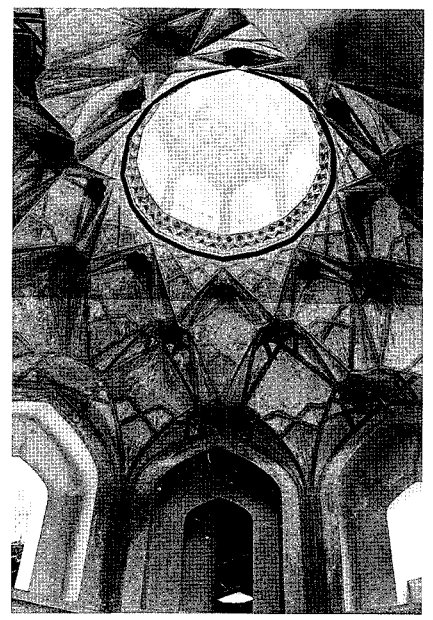


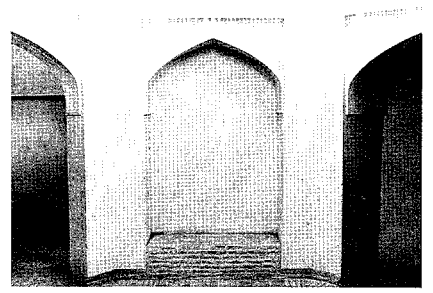
ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: Compared with House I and II, Yazd, the "tartan" here is not even a local system It approaches to being a figure in itself The principal spatial figures (courtyard and special rooms) 'float" with respect to each other; the floating quality is epitomized by the contorted entry path The pair of diagrams at the bottom illustrates the complexity of order in this house An echelon of increasingly larger walls is complemented by three experiential axes tying main court to garden The visual link between upper storey contemplation room and garden gate is the most surprising of the three because of the level change A house which seems to be at first sight casually planned, reveals a subtle order of frontal walls and selective sight lines which account for much of its beauty

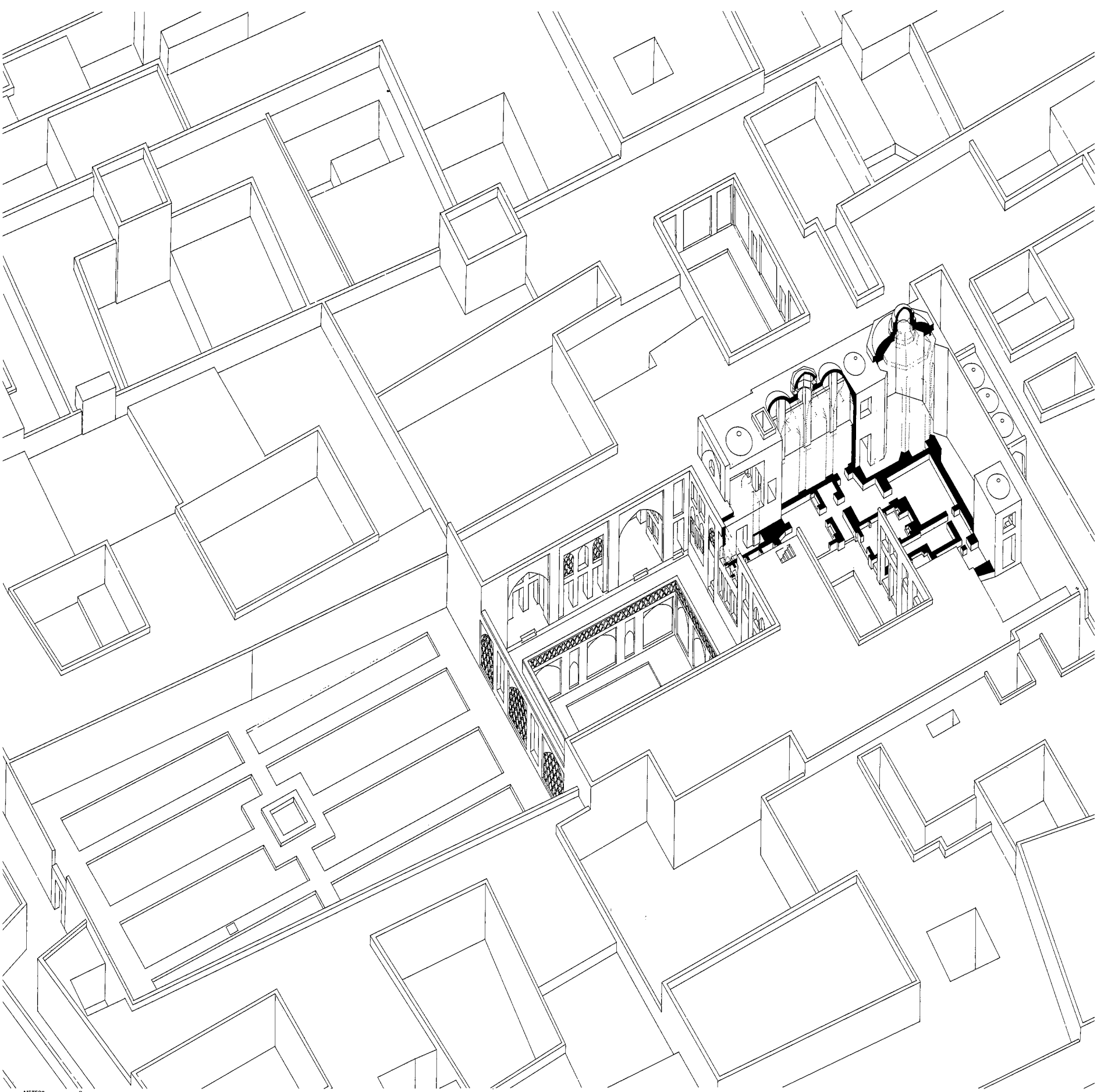
RIGHT: Looking southeast from the minaret of the Friday Mosque toward Isfahan with the desert in the distance The *hashti* of this house is to the right in the foreground The entry to the house is through the archway to the left of the *hashti*'s dome



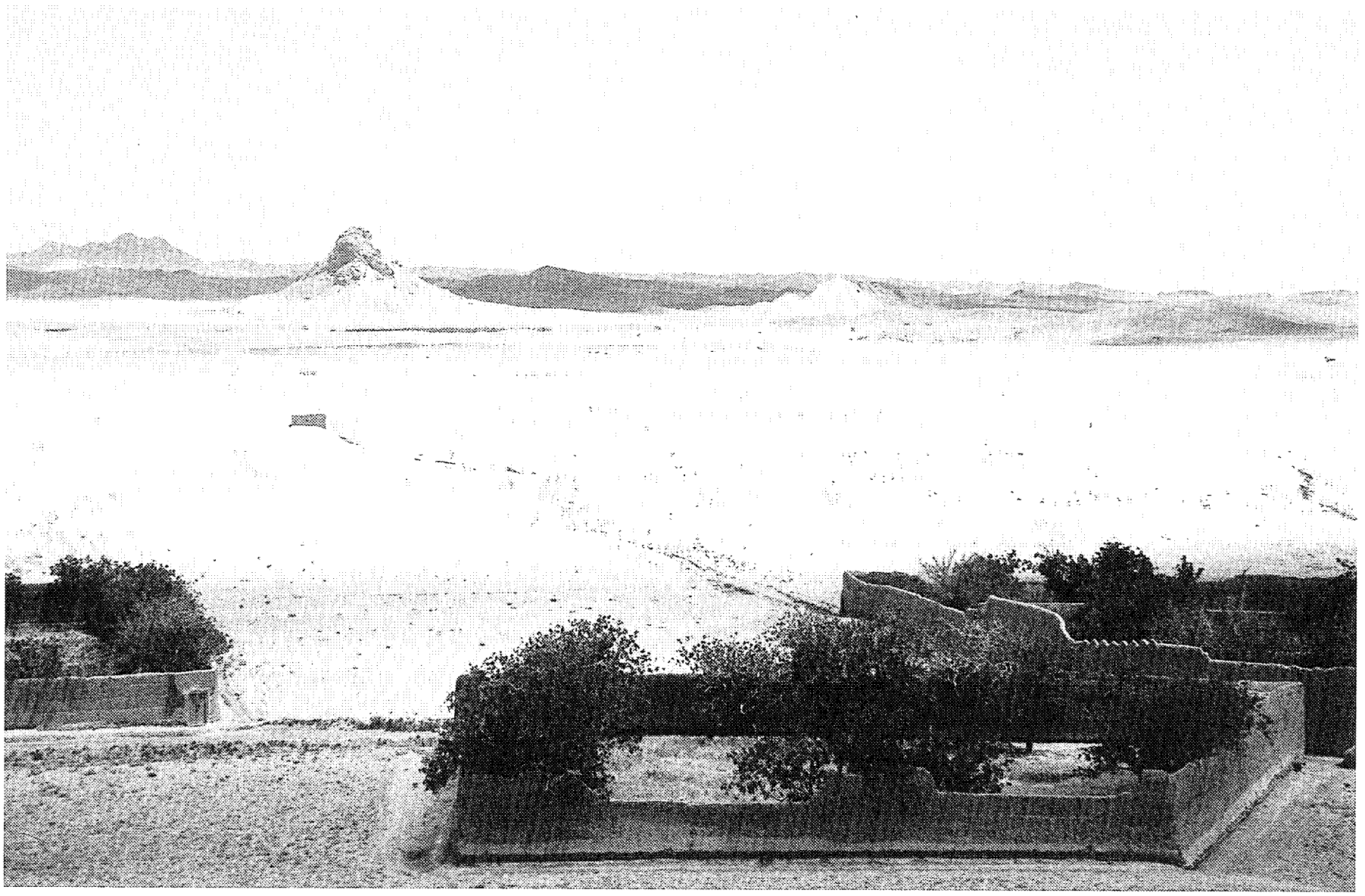




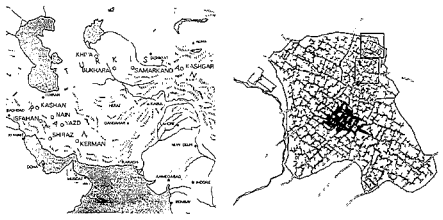




Cut axonometric of Nayin House revealing the entry path to the main court and the room of contemplation above the south corner of the court



Nayin, orchards at outskirts of town protected from the desert by walls Water comes to the orchards from the far-off mountains by a system of underground channels called quanats

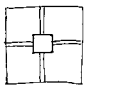


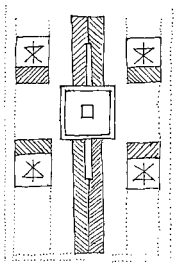
THREE GARDENS

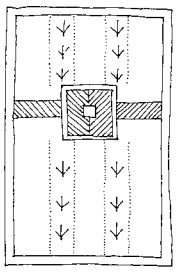
YAZD KASHAN SHIRAZ

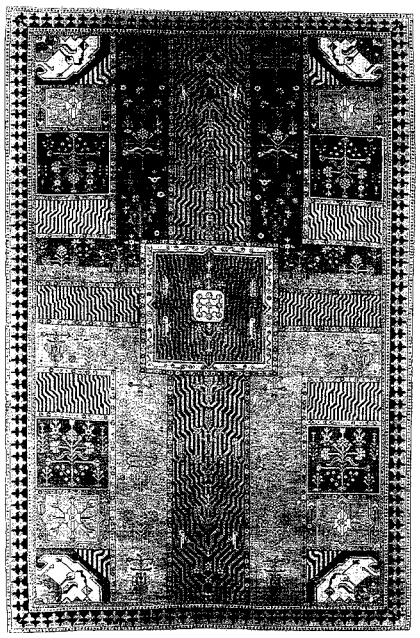
The classical Iranian garden must speak to all five senses The experience is sensual as well as spiritual The garden is designed to accentuate the smells of lush plants, the sounds of rushing water and singing birds, the textures of smooth tile and moist earth, the tastes of sun-warmed fruit, and the sights of colorful flowers and mosaics mirrored in placid pools It exists on both the most abstract symbolic level and the most direct experiential level at the same time The sensual engagement is cyclical, based on the temporal effects of night and day and the seasons

The word "paradise" comes from the concept of the Iranian garden *("Firdaus"* in the Farsi language means enclosed garden) The idea of paradise delights all the senses as well as the soul It is important to note that the Iranian garden is an enclosed or walled space, thus a special kind of "building " The garden which is embedded in the city fabric is a most special paradise analogous to a green oasis in the desert





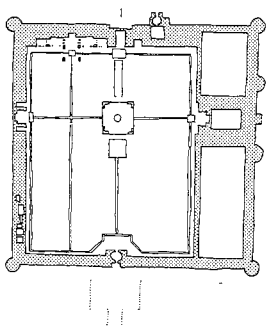


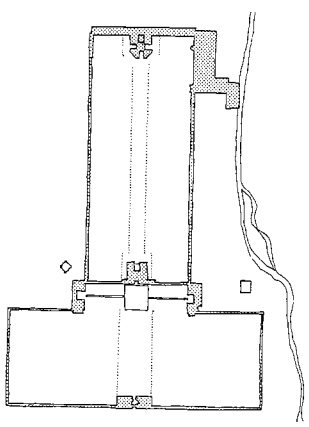


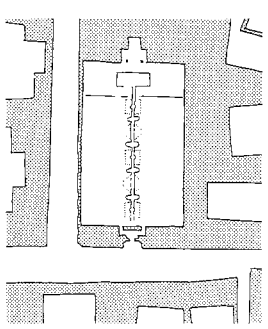
ASPECTS OF FORMAL STRUCTURE:
A garden carpet is literally a representation of a Persian garden, with all its allegory and symbolism It is a two-dimensional artifact emblematic of the three-dimensional reality Thus it indicates a certain mindset just as the miniature Shah Mosque comparison does on page 18

First, there is the formal structure of the carpet itself Based on the undifferentiated square archetype, two levels of patterns become apparent: those which support the archetype and those which give the archetype a preferred direction The result is both a representation and an everyday artifact The representation is that of the water flow, which gives any garden a preferred direction (here, in Bahg-I-Fin, toward the city of Kashan and the desert beyond) In terms of everyday use, when placed facing Mecca, the "garden rug" becomes a "prayer" rug

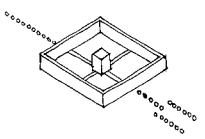
Second, relying on the garden as an emblem, the three gardens shown here can be interpreted in terms of their relationship to the archetypal quality of form and in terms of their relative "object-volume" versus "object-void " The garden in Iran and Turkistan is always defined by a wall, which creates an introverted world While the archetypal form is almost literal in Bagh-I-Fin, it is figurative in Divan Khaneh; the Bagh-I-Dolatabad is the bridge Being in the countryside, the Bagh-I-Fin has an "object-volume" quality, whereas the Divan Khaneh is experienced as an "object-void" in the dense urban fabric The Bagh-I-Dolatabad, just beyond the city walls of Yazd, is an in-between version



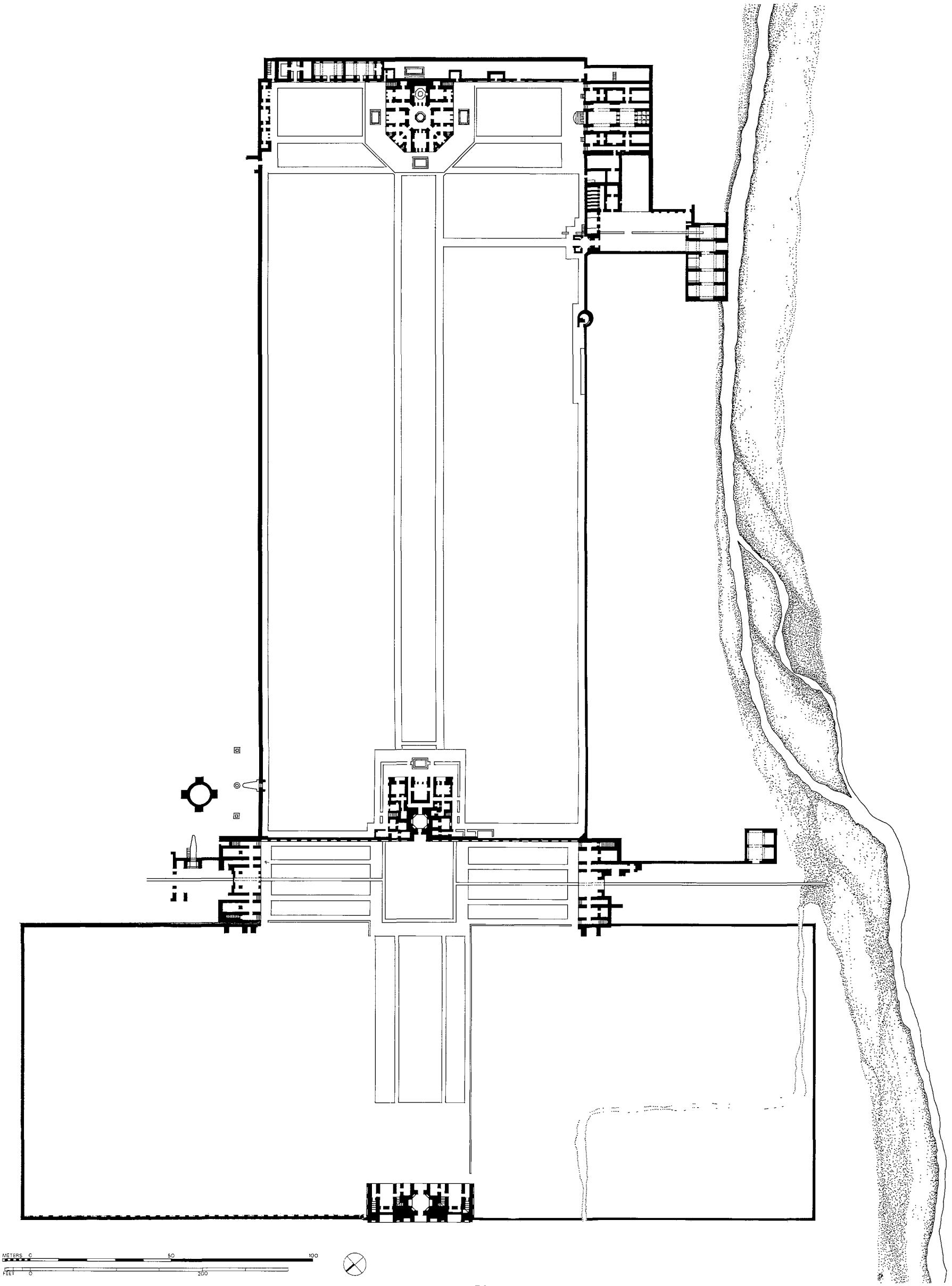




Page 50: Plan Bagh-I-Dolatabad, outside the city walls of Yazd, is a formal garden built about 1712 as the quarters for the governor The 27 acres of the garden are divided into two parts: a private garden for the family and a garden for ceremonies and sports Facing the warmth of the southern exposure is the winter pavilion in the family garden Opposite is the summer pavilion, shaded from hot weather and cooled by five interior pools and breezes from the wind tower *(bad-ghir)* The strip that runs on the central axis between the two buildings is planted with clover, while the two flanking yards are planted with cherry and pomegranate trees The women's quarters and kitchen are built against the walls of the ceremonial garden



BELOW: Looking southeast down the central axis toward the summer pavilion with a tall wind tower in the back The breezes are brought in through the wind tower and cooled as they move out across the water of the interior pools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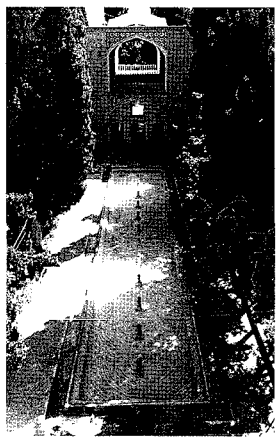
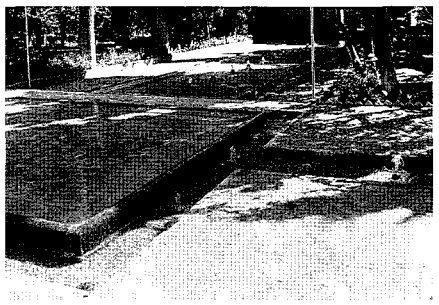
Bagh-I-Fin is a water garden a few miles north of Kashan It was first built by Shah Abbas I in 1590 with later renovation attributed to Fath 'Ali-Shah (1799–1834) Water, the most important element of Bagh-I-Fin, comes from a spring said to have curative powers The water is brought to the garden from the mountains by a system of *qanats* (underground aqueducts) It runs through channels and pools throughout the garden which is planted with cypress and plane trees The use of numerical symbolism is apparent here in the division into four quadrants alluding to the four rivers of life, the four corners of the earth, and so forth

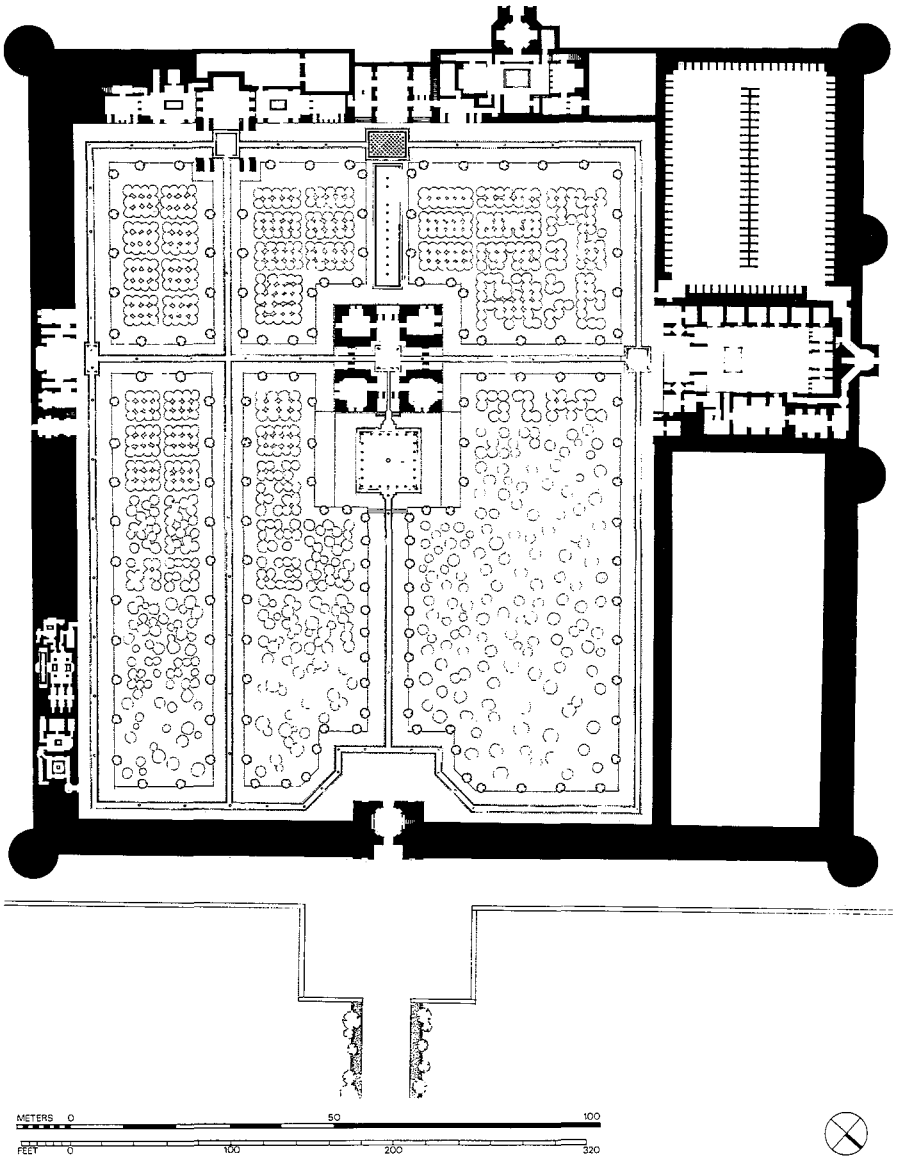


LEFT: Pool located in the pavilion at the center of the garden One submerged spout feeds the pool whose water flows over into the channels

LEFT: Water issuing from 12 spouts fills another pool and overflows into channels leading to a two-storey pavilion The upper storey of the pavilion has a covered terrace with a circular opening cut into the center of the floor to allow cool air to rise up from the pool below



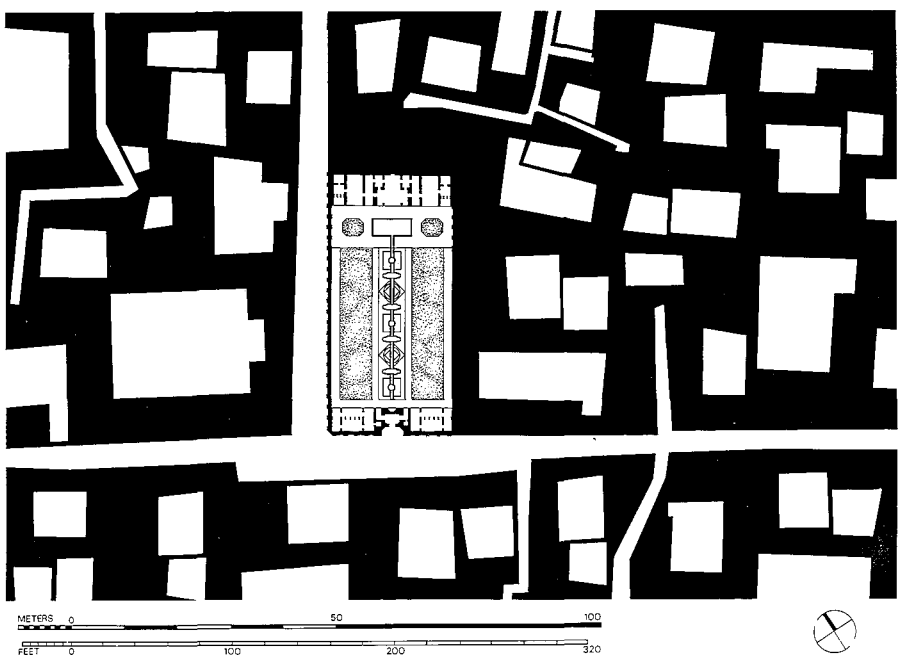
LEFT: The first shallow pool nearest the southwest wall Water from the spring is forced up by natural pressure through a series of holes in the floor of the pool It flows over into a system of channels which runs along the southwest wall as well as toward the center of the garden into the main pavilion

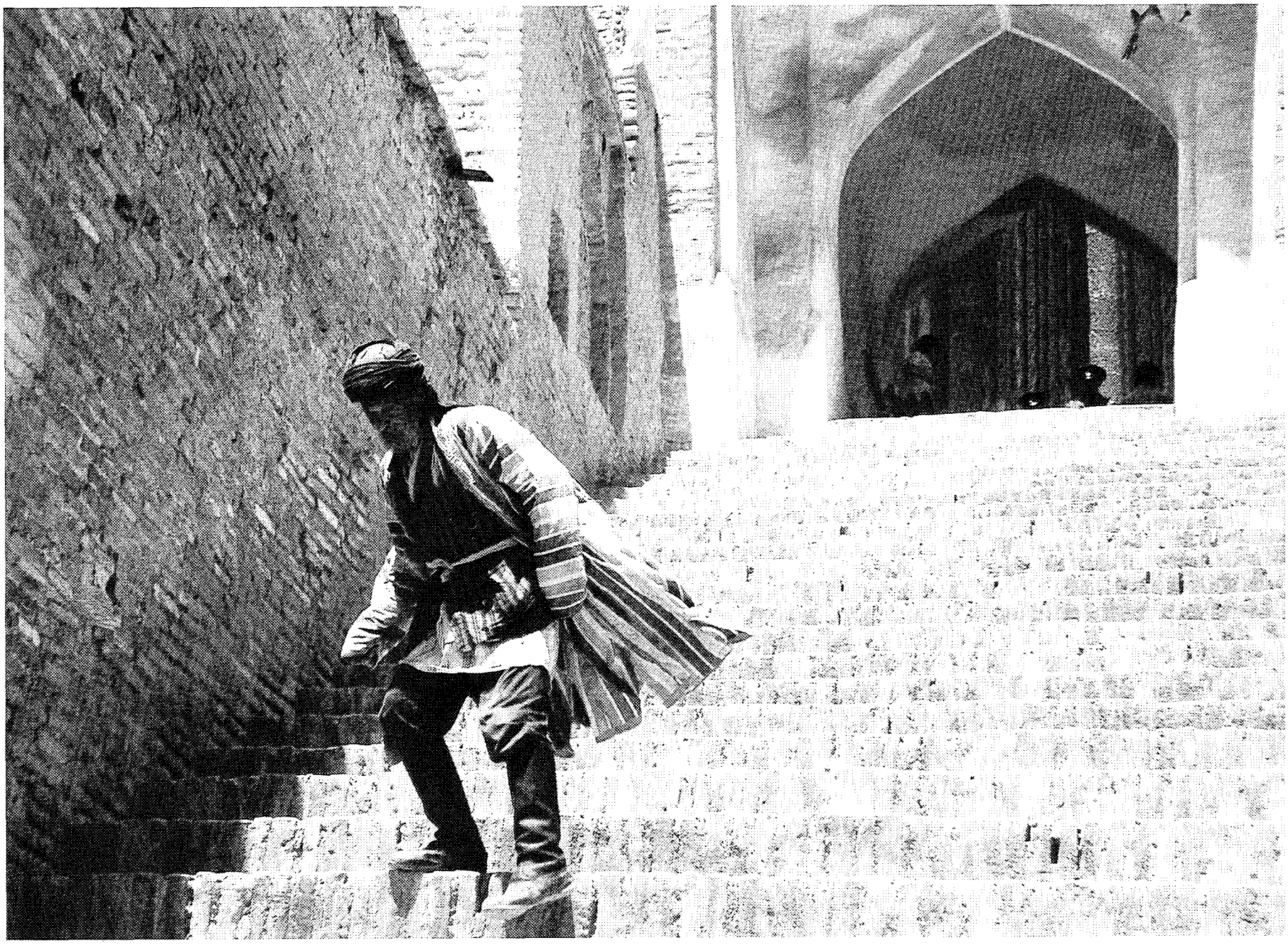


Plan of the Divan Khaneh, built in the early 19th century and belonging to the Qavam-Shirazi family The kitchen and servants' quarters are along the street, while the main block, along the opposite wall, houses the living quarters

LEFT: *Talar* embedded in the north wall As it faces south it needs curtains to provide shade

LEFT: Entrance embedded in the south wall looking from the *talar* (open air living porch)

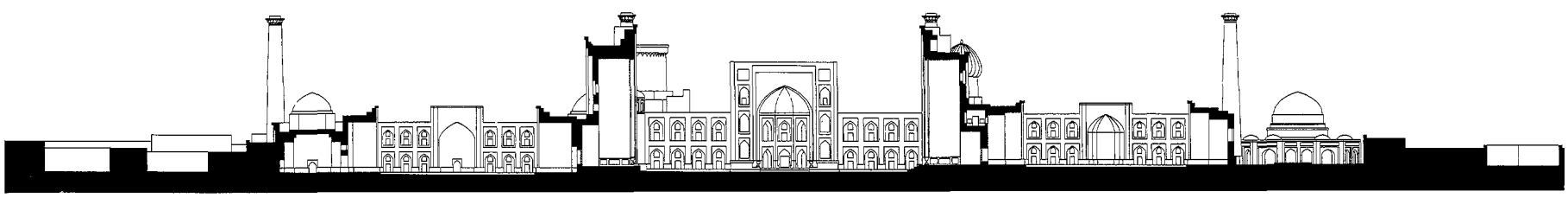


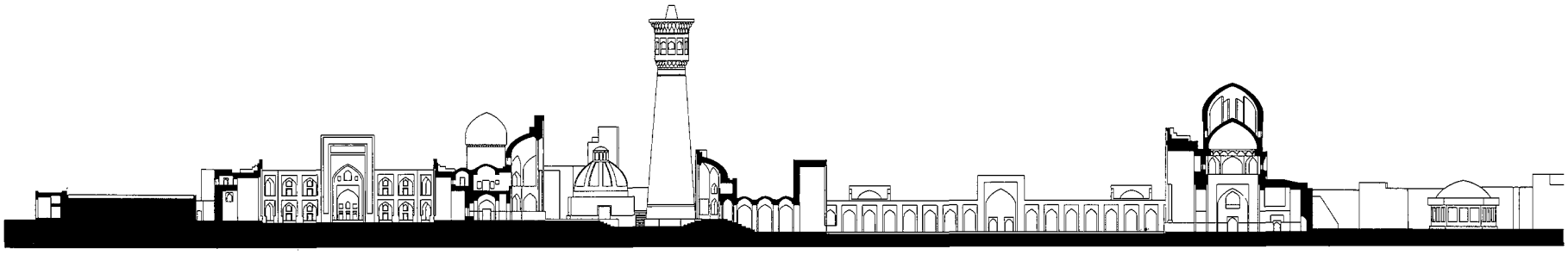


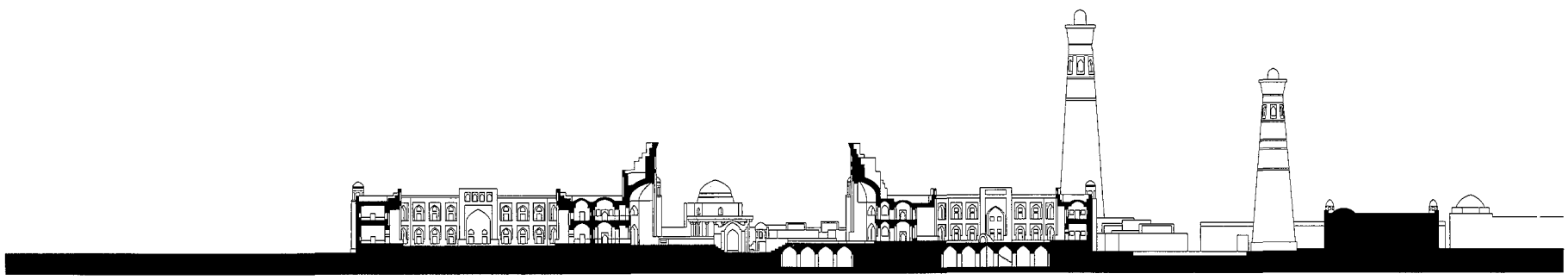
Old Uzbek man coming down a flight of stairs from the Shah-I-Zindeh tomb complex, (Timurid period) located to the northeast outside the walls of Samarkand

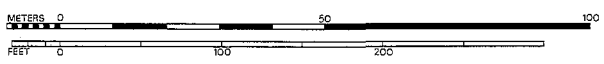
THREE CITIES IN TURKISTAN

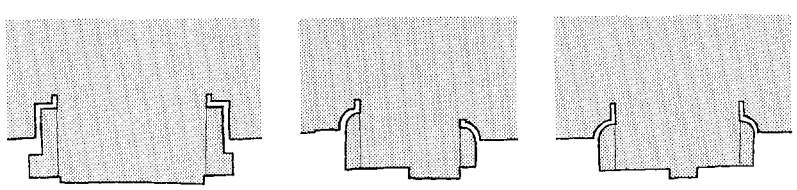
SAMARKAND BUKHARA KHIVA











ASPECTS OF FORMAL STRUCTURE:
FROM LEFT TO RIGHT: In Samarkand, the space made by the *kosh* condition of major *iwans* is pure and therefore most imposing In Bukhara, one platform bisects the space In Khiva, two opposing platforms recreate a street condition, thus the face to face *(kosh)* condition is brought back

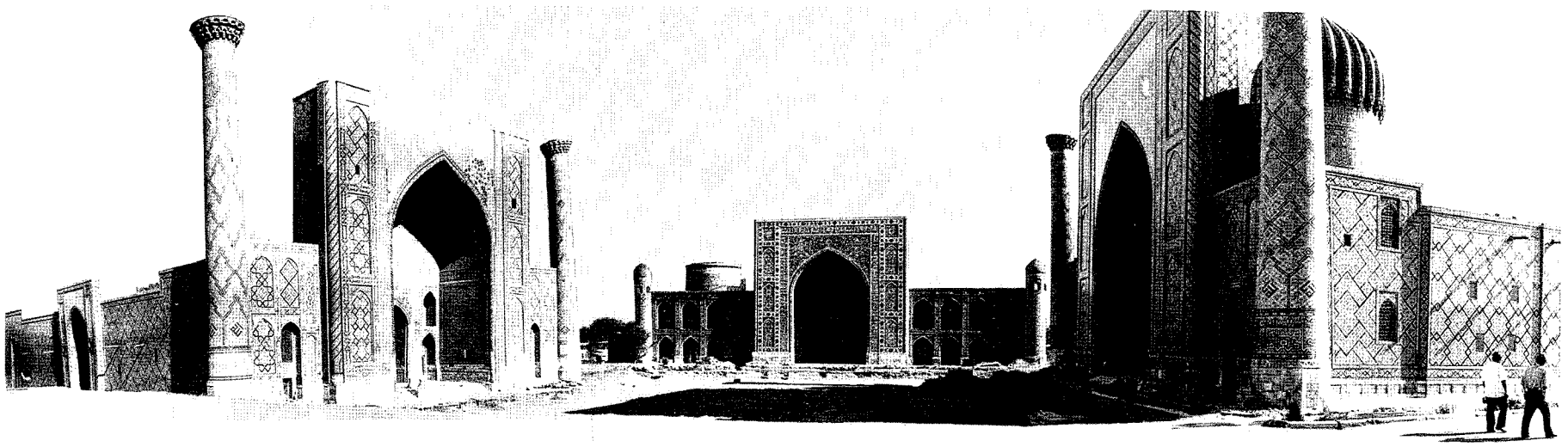
TOP: Samarkand; east-west section through Ulugh Beg Madrasa (15th c), Registan, Shir-Dor Madrasa (late 17th c), looking at the Tillya-Kari Madrasa (late 17th c)

MIDDLE: Bukhara; east-west section through Mir-I-Arab Madrasa (16th c), Kalyan Mosque (early 16th c on site of 12th c mosque), looking at Kalyan minaret (1127)

BOTTOM: Khiva; east-west section through the Ichan-Qala (Inner City) showing the Allah Quli Khan Madrasa with its platform (early 19th c), the Qutlugh Murad Inak Madrasa with its platform (early 19th c), and the winter mosque underneath To the south are the Aq Mosque (mid-17th c), the Friday Mosque with minaret (originally built in the 10th c), and the Islam Khodja Mosque and minaret (early 20th c)

SAMARKAND

TURKISTAN

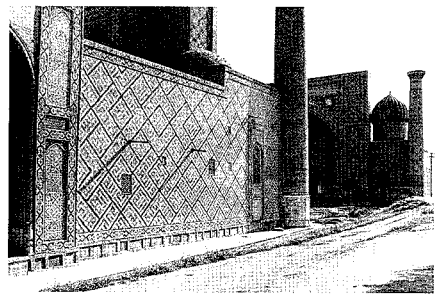


Samarkand is located in the heartland of Turkistan It lies on the ancient silk route, which connected Europe, the Middle East, Iran, Turkistan, and China for many centuries One of the best known travelers over the silk route to Peking was Marco Polo, as far back as the 13th century

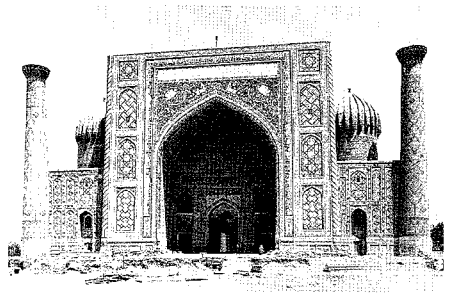
Genghis Khan and his Mongolian hordes razed Samarkand in the 13th century Under Tamerlane, a descendent of Genghis Khan, Samarkand became the fabled city, the political and cultural pivot of the vast Timurid Empire (1370–1449), including Turkistan and Iran

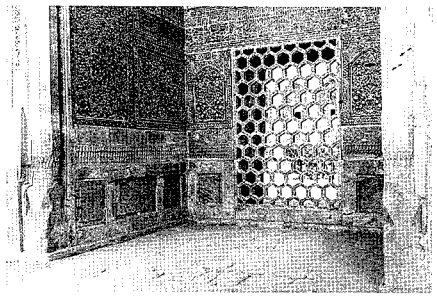
The Registan in Samarkand has existed since the reign of the famous Tamerlane (1336–1405) This "Sandy Place," named for the sand deposits left from an irrigation ditch which crossed it, was built upon by a succession of Timurid and Shaibanid rulers Tamerlane's grandson, the Scholar-Ruler Ulugh Beg (1409–49), first built a madrasa in his name, the Ulugh Beg Madrasa (1417–20) along with a caravansarai, a *khanaqah,* and a mosque By the 17th century an independent Shaibanid ruler, Yalangtush Bahadur, had his architect Abdul Jabbar replace the mosque and caravansarai with the *Shir-Dor* ("lion's gate") Madrasa (1619–35) and the *Tillya-Kari* ("gold all over") Madrasa and mosque (1646–47)

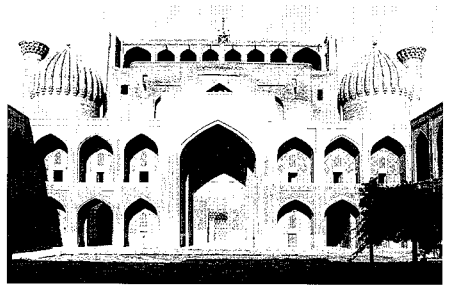
ABOVE: Looking at the Tillya-Kari Madrasa with the Ulugh Beg Madrasa to the left and the Shir-Dor Madrasa to the right

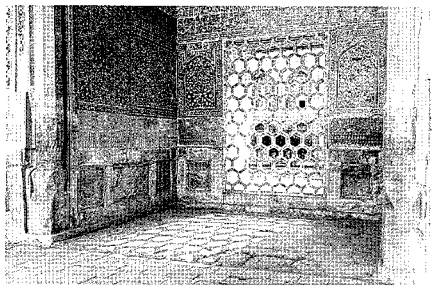


RIGHT: Foliage obscuring the view of the south walls of the Ulugh Beg Madrasa in the foreground and the Shir-Dor Madrasa beyond As one approaches, the foliage allows only glimpses of the building group which diminishes its monumentality The next view reveals the south walls of the madrasas clearly, allowing the group to be read as a monumental complex



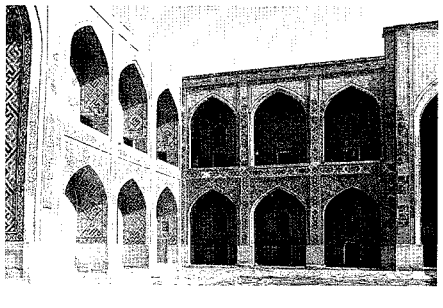




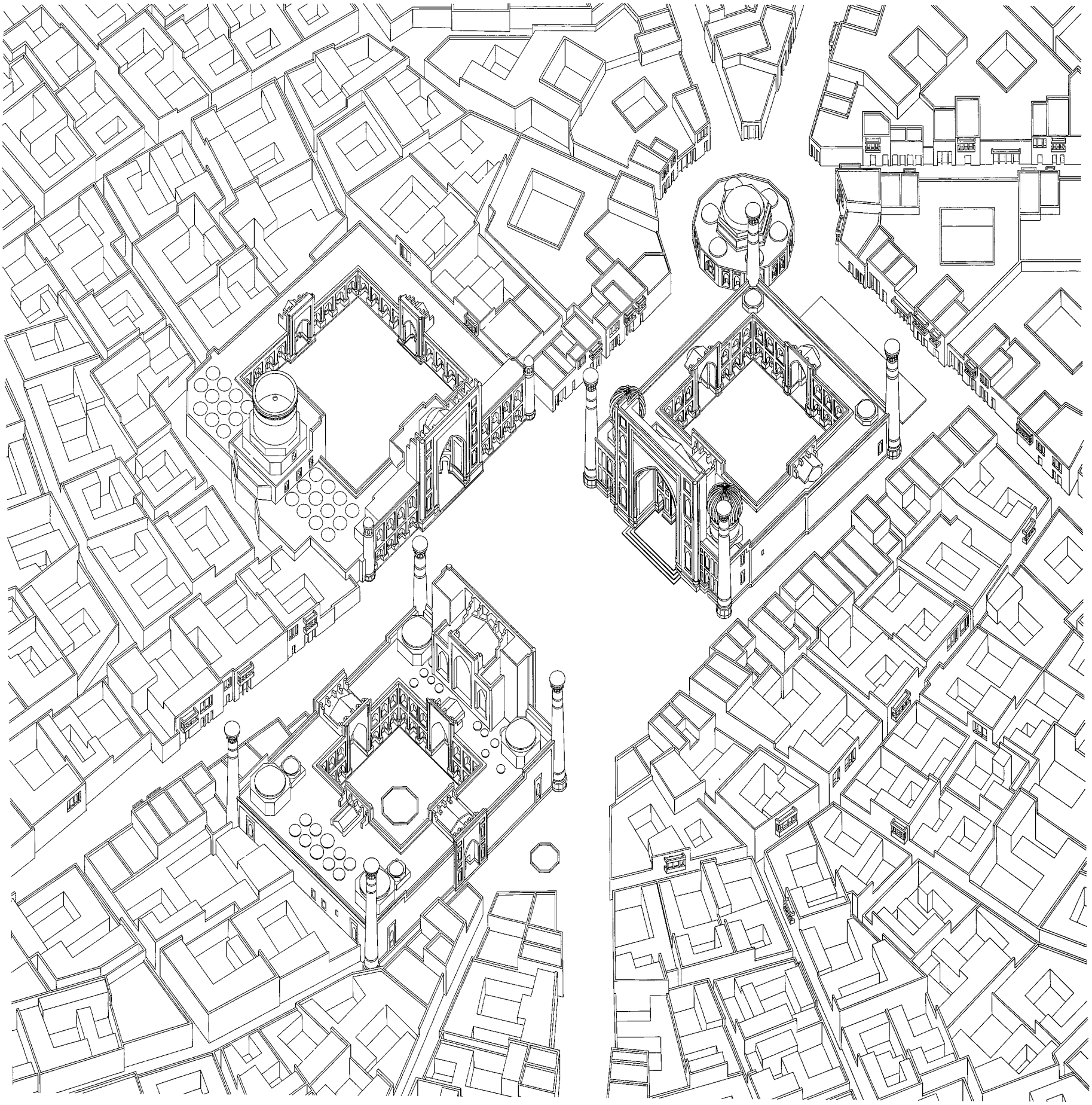


RIGHT: The renovated Shir Dor Madrasa as seen from the Registan (above) Looking back at the entrance of the Shir-Dor from its courtyard (bottom) The build-up of the exaggerated *iwan* wall, with its "billboard" appearance, is visible from the courtyard The supporting structure is hidden from the outside Note the contrast in scale between a simple door and the monumentality of the *iwan*

FAR RIGHT: Traditionally, entrance to a mosque is never direct In this example there is a screen door in the center of the main facade which allows one to see in, but not enter The screen in evening light appears fully as part of the surface it lies in The emphasis is on the light-filled interior of the court In morning light the opposite case is seen as the screen becomes an object in itself This perception is emphasized by its shadow



LEFT: The courtyard corner of Shir-Dor Madrasa Unlike its Iranian counterpart, the facade turns the corner without transition All cells on the upper storey are connected through the piers between them, thereby reducing the privacy afforded to the upper-storey cells in a Turkistani madrasa



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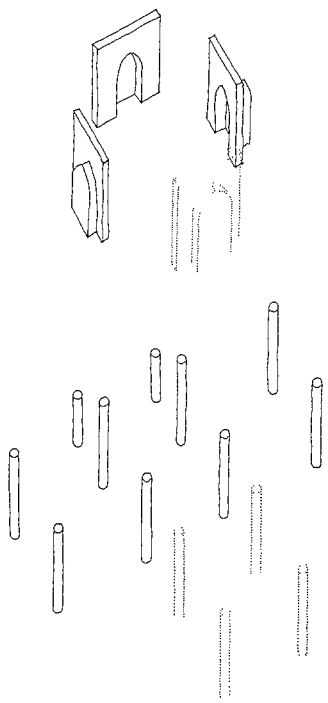
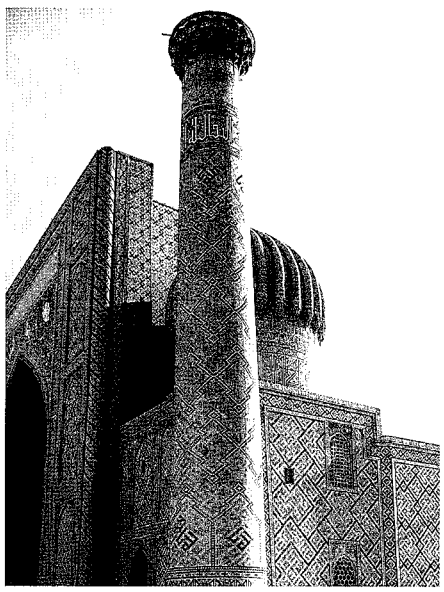
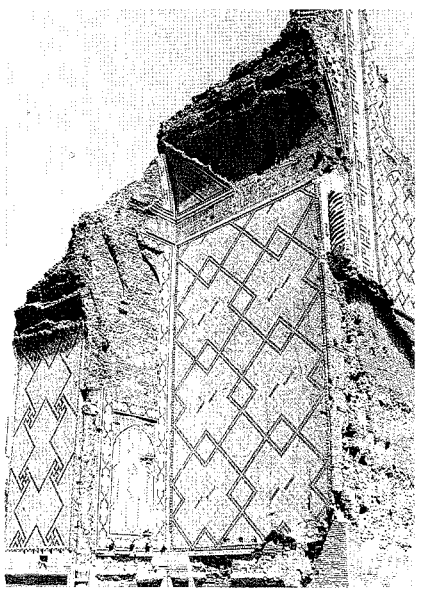
Axonometric looking from the southwest of a hypothetical reconstruction of the Registan in the late 19th century The three major buildings are increasingly independent from the city fabric: Tillya-Kari Madrasa completely engaged in the fabric so that its facade becomes the street facade, Ulugh Beg Madrasa engaged only on the western side, and Shir-Dor Madrasa, completely disengaged and, therefore, perceived as an object-building

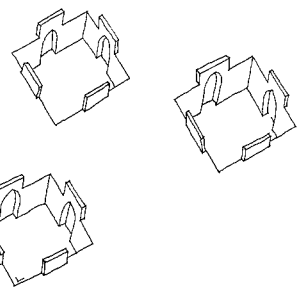


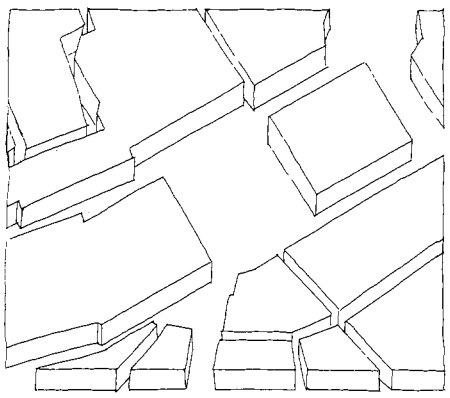
RIGHT: Looking southwest from the Shir-Dor Madrasa Decoration is seen here on a grand, and perhaps abrupt, scale If not for the careful restoration of its exterior (See historical view below) this building may well have suffered the same fate as the great Bibi Khanum Mosque

FAR RIGHT: Main *iwan* of the Friday Mosque called Bibi Khanum (begun 1399) The mosque began to deteriorate soon after it was built and was later destroyed by an earthquake Because it was built so hastily (the layers of construction were not sufficiently tied back to the brick mass) the whole structure was shaken to ruins by the 17th century The tile work next to the layers of brick looks as through it is peeling away Tile was applied almost like wallpaper would be applied to an interior today



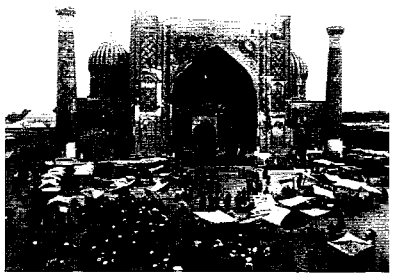


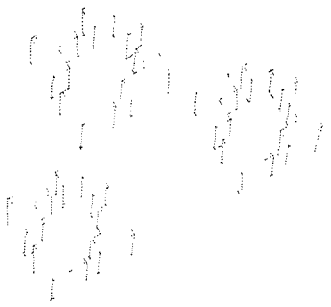




RIGHT: Use of the Registan as a marketplace in the late 19th century

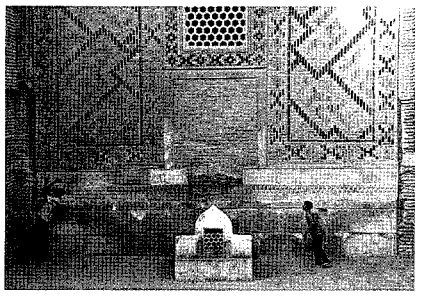
FAR RIGHT: Bibi Khanum Mosque in the late 19th century Note the bazaar building in the foreground

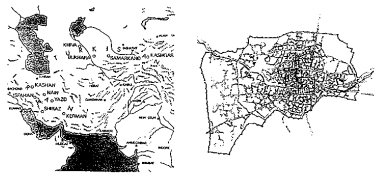




ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: First, the *kosh* condition at the time of Ulugh Beg (c 1420) was accentuated by the placement of a mosque in the Registan space Second, the collection of minarets creates an ambiguity between the interior and exterior spaces Third, the *kosh* condition is replicated inside each of the three existing madrasas Fourth, an abstraction of the city fabric at the roof level This is the basic volumetric relief into which the replicated *kosh* conditions are inserted, and to which the minarets are added Fifth, unlike the Iranian madrasas, the corner volumes of Turkistani madrasas are solid

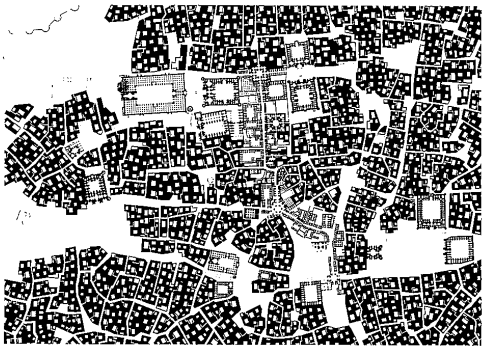
RIGHT: Two boys playing ball in a "found" space: a niche in the Gur Emir Mausoleum (1404) The ventilation shaft to Tamerlane's tomb in the crypt below serves as a division of the playing field

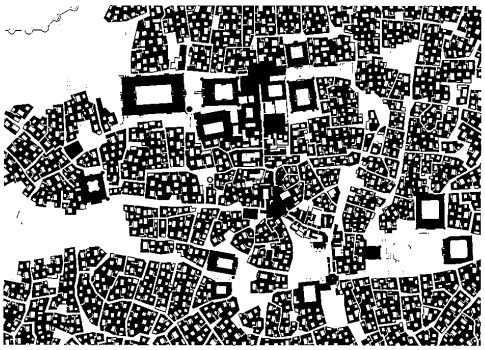




BUKHARA

TURKISTAN

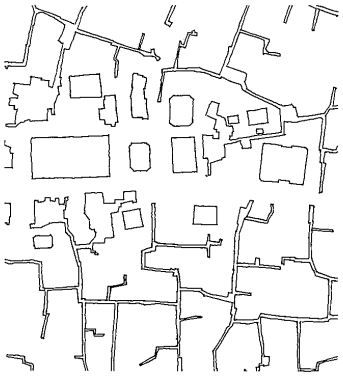


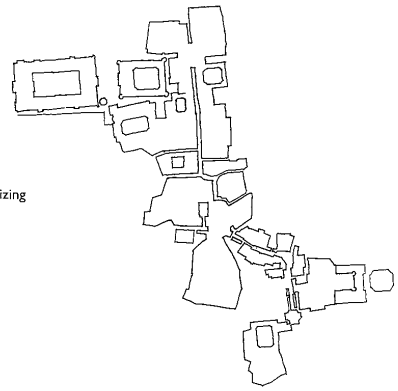


Bukhara, separated by some 170 miles of desert from Samarkand on the silk route, fell within the Timurid domaine It was the capital city with its own *khanates*, before and after the Timurid reign, for example, the Samanids (an Iranian dynasty) ruled Bukhara before the Timurids Bukhara possessed one of the richest bazaars of Turkistan well into the 19th century, particularly sought after for rugs

The cities along the silk route had a multitude of different ethnic groups, including Monguls, Turks, and Iranians Most of these people had recent nomadic histories, except for Iranians who had a long history of city life Yet, inevitably, there was a continual cultural interchange Therefore, an exact tracing of the intersecting lines is impossible Turkistan and central Asia in general contain a conglomeration of peoples whose architecture includes nomadic as well as sedentary characteristics

TOP LEFT: Nolli-type plan of Bukhara reveals the extent and the figural quality of the ensemble of public buildings and thus the realm of public activity This representation of the city is similar to those of Kerman, Isfahan, and Khiva

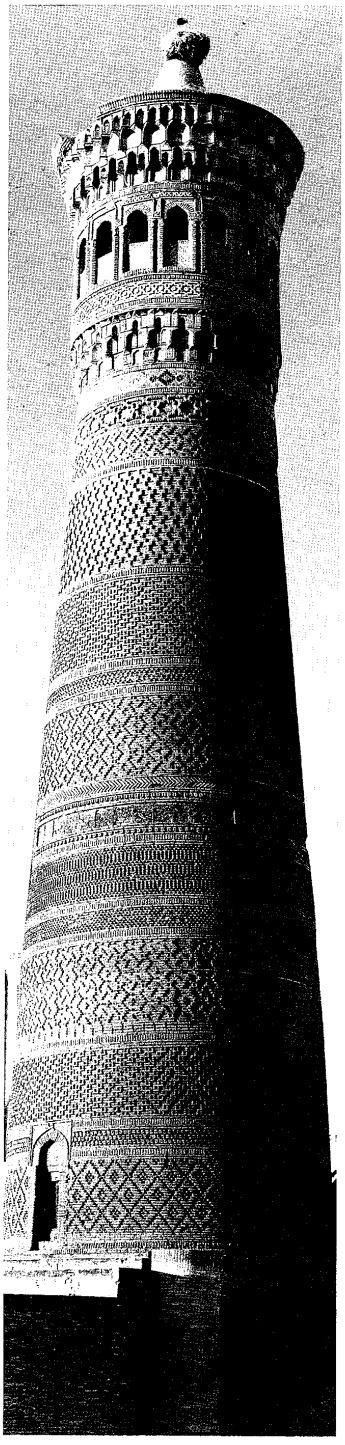


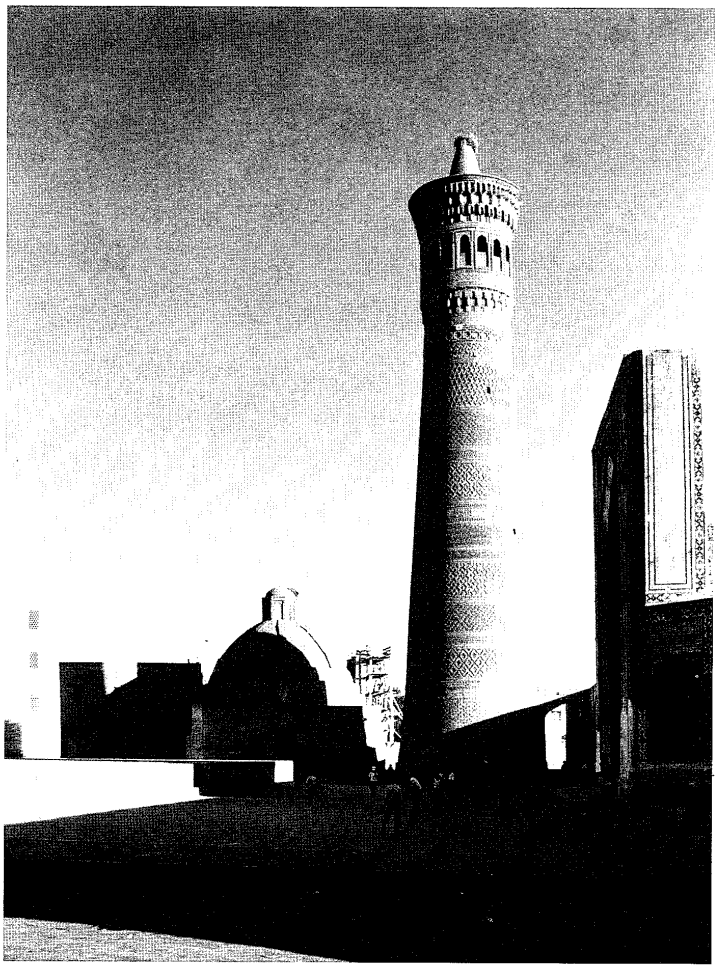


LEFT: Figure/ground plan does the opposite by equalizing public and private structures into a unified whole *(umma)*

ASPECTS OF FORMAL STRUCTURE:
A comparison of the "main streets" of Kerman, Bukhara, and Khiva Top, Kerman shows uniform city fabric with the main street integrated Middle, Bukhara shows pieces of the city fabric with the main street revealing itself intermittently Bottom, Khiva shows distant "objects" and open spaces with the main street implied in the spaces between

LEFT: One of many public reservoirs *(khaus)* throughout Bukhara used in the past as a source of water for drinking, cooking, and bathing This example is in the madrasa ensemble in lower right corner of the city plan Today the reservoir serves as the main gathering point in town



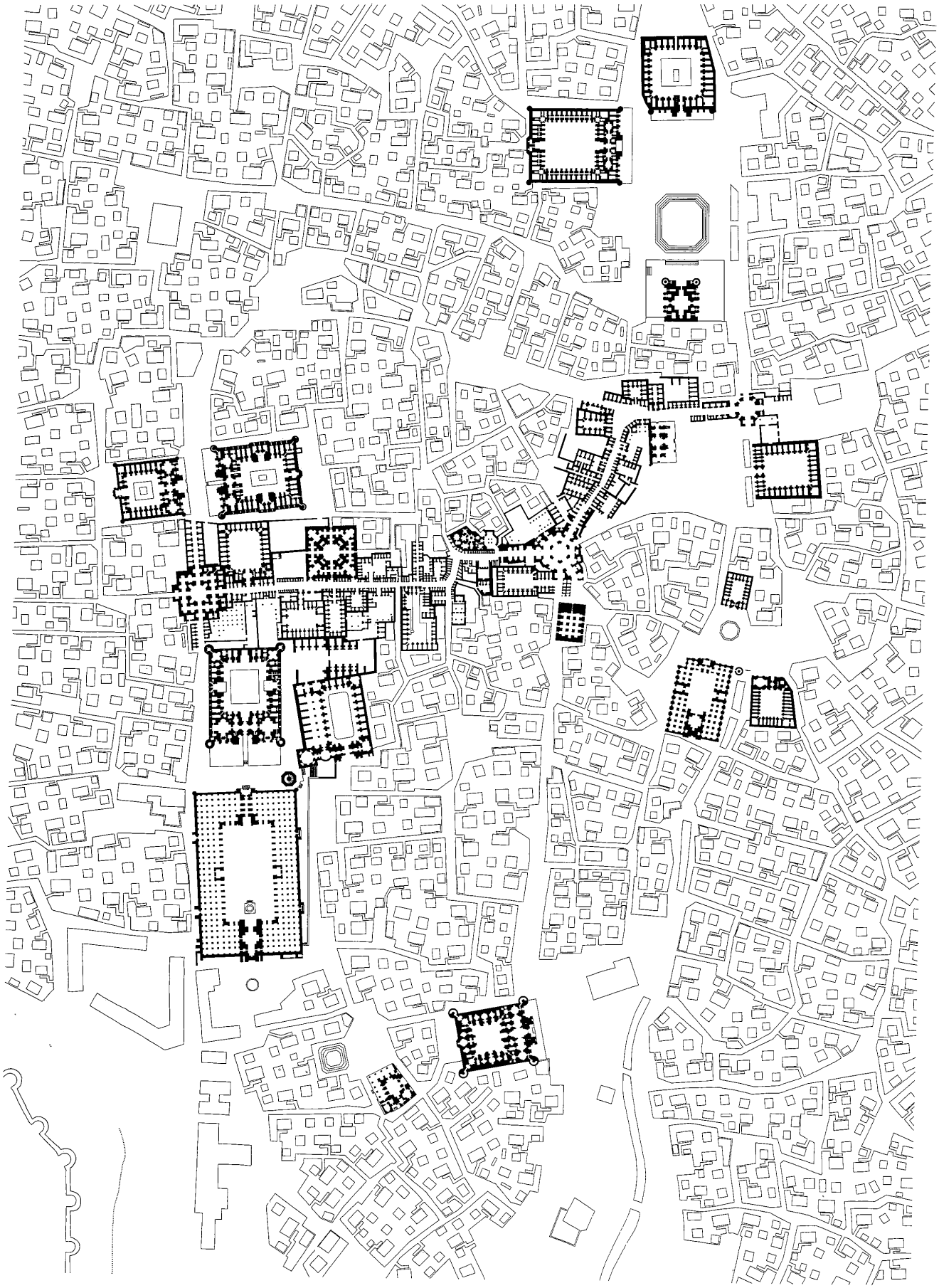


LEFT: The most famous minaret of its time in the Islamic world, the Kalyan Minaret (1127) from the west At that time, decoration was achieved through the texture produced by the building material itself rather than through the application of color in tile or paint

RIGHT: Boys playing soccer in the late afternoon between the Kalyan Mosque and minaret and the low wall of the platform projecting from the Mir-I-Arab Madrasa The insertion of this large platform—also visible on the axonometric—invites use of the other half of the space (in this case appropriately shaded) for purposes suited to the reduced scale

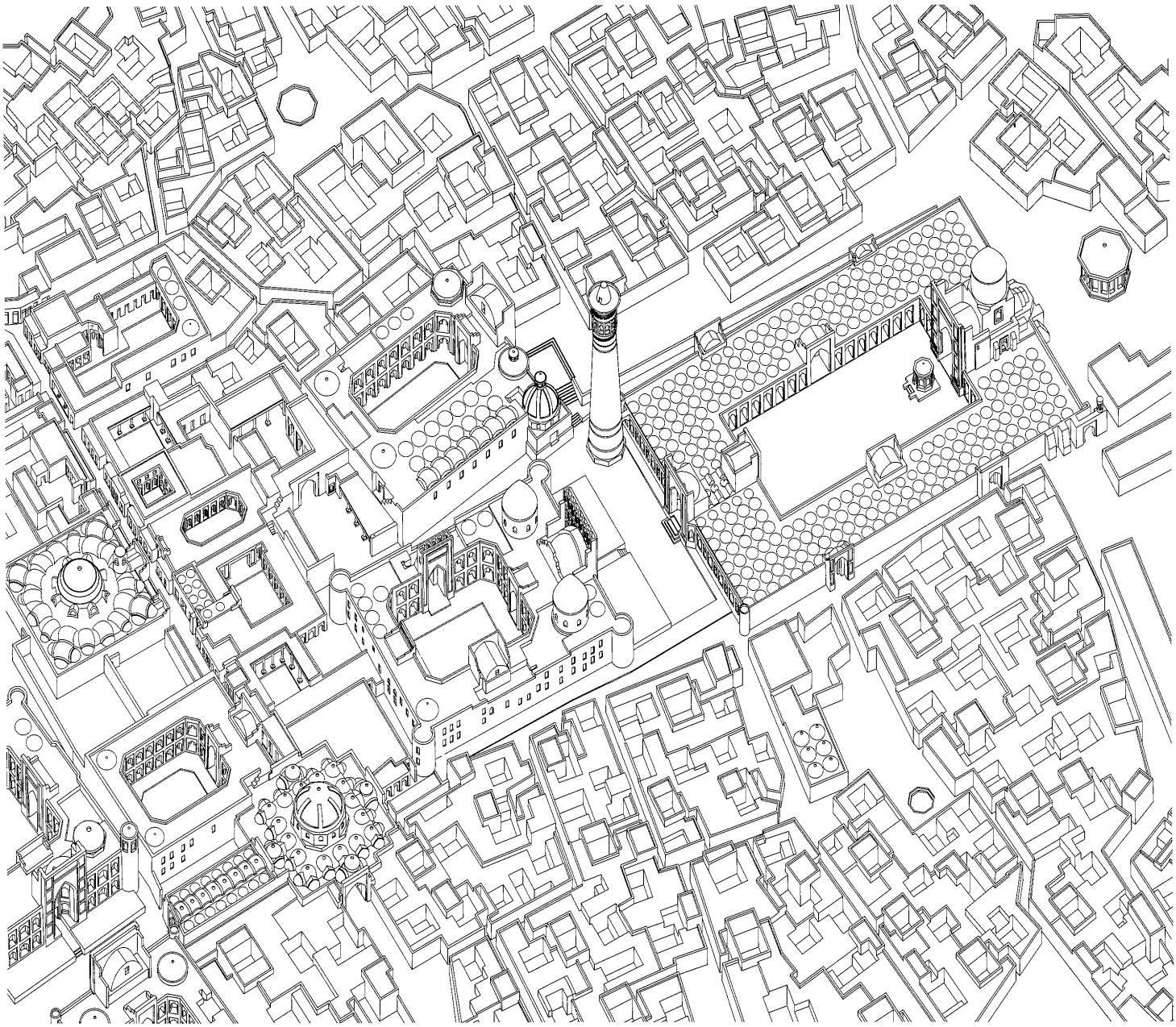
RIGHT: Use of the same space in the late 19th century showing a temporary bazaar Note the "mobile" bazaar and its tenuous relationship with its surrounding buildings The bazaar stalls form a wall that encloses the space of the square

FAR RIGHT: Woman descending steps in the bazaar in Bukhara near the Kalyan complex, 19th century



Reconstructed plan of the city center of Bukhara in the 17th century showing the bazaar and the adjacent commerical and religious buildings

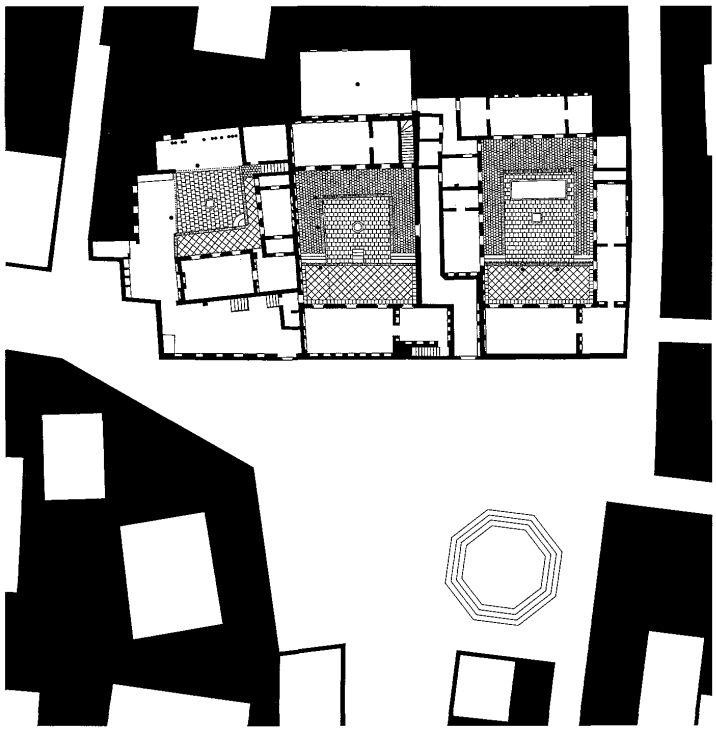
Bukhara, space between Kalyan Mosque (right) and the Mir-I-Arab Madrasa (left) In the shadows of late afternoon on a hot summer day, the lower part of the space is ideal for soccer playing



Axonometric of major public buildings in the city fabric from the northeast: The Kalyan Mosque complex with the Mir-I-Arab Madrasa, minaret, and bazaar

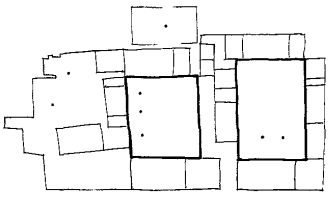
TWO HOUSES

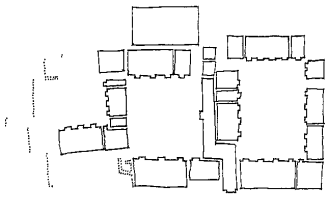
BUKHARA



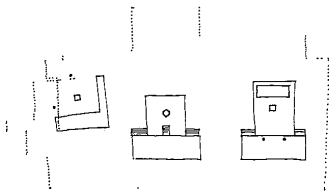
The Turkistani house of the 18th and 19th centuries is usually two stories high (the Khiva house being a special case), with a few rooms and some porches on the upper floor Vines often provide additional shade from the scorching summer sun Wood columns are elaborately carved and prominently displayed

The internal planning is suited to the available site, using elements such as level changes and roof overhangs freely and to maximum advantage Whereas the "Arab" house of Iran is planned from the inside out—from the court to the perimeter of the property—the house of this central Asian region is a collection of elements, more often responding to the boundaries of the site than to a preconceived spatial ideal

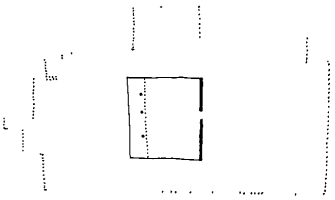




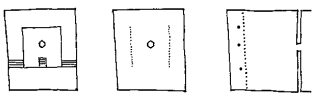
Plan of House 1 in Bukhara This two-storey house, half of which is fully embedded in the city fabric, has its main entry on the eastern side of the southern wall The women's quarters are to the right surrounding a private court The main living quarters contain the central court to the left of the entry At the north side of the main court are the summer quarters with a storage room beyond At the south side of the main court are the winter quarters The small court to the west of the main court contains the kitchen and hygienic facilities Note that the courts have less formality than those of an Iranian house: The axiality in the disposition of rooms related to the court is less strict The house is made of mud-brick and wood



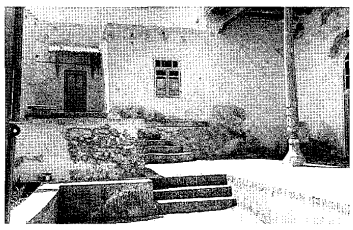
North-south section through the main court of the house cutting through fountain/reservoir Note the lower basement rooms for use in the summer

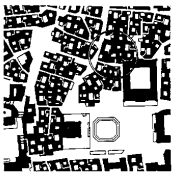


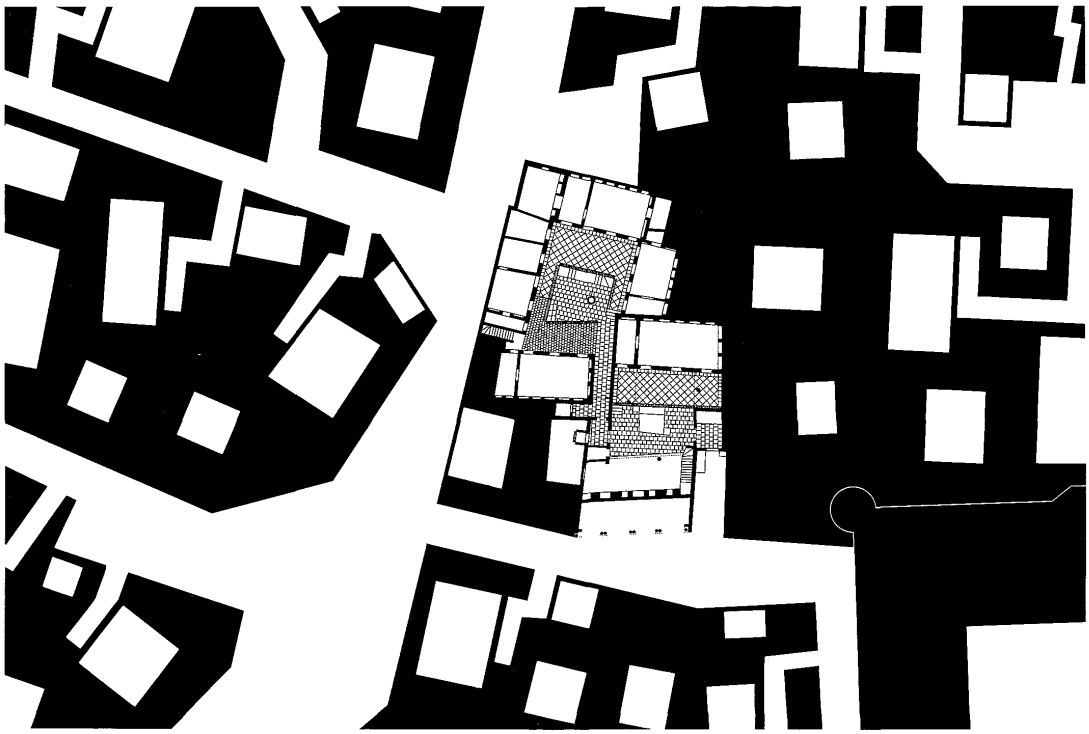
ASPECTS OF FORMAL STRUCTURE:
In contrast to the houses in Yazd and Nayin, this Turkistani house displays a certain prominence by facing onto its own open space with a reservoir Instead of a dominant *talar*, as seen in the Iranian houses, the focus is the center of the courtyard marked by a small pool The rooms of the house have their own identity, irrespective of the courtyards



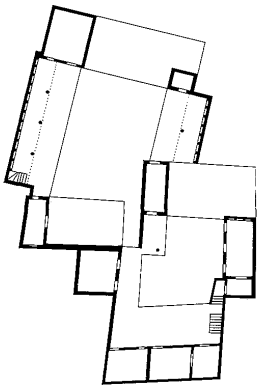
BELOW: Typical Turkistani house The irregular courtyard with several levels indicating different degrees of privacy A man-made "landscape" is created within the confines of the house Note the *talar* space on the right



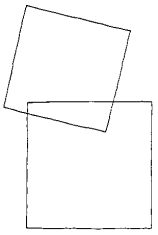


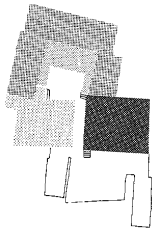


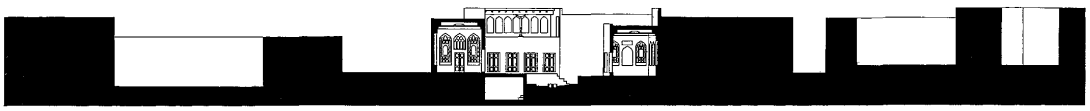
Plan of House II in Bukhara. The main entry to this two-storey house is off a small alley running east-west Directly to the west of the entry is a rentable space for stalls The entry leads to the main family court Note the porches which precede the rooms off the court This is traditional in Turkistani houses Walking west from the court one comes to a corridor with the kitchen and lavatories off of it The corridor leads to the women's quarters at the north side of the house The elaborate paving and level changes of the court create an interior landscape to be freely interpreted by residents and visitors

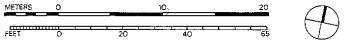


ABOVE: Second level of House II Note "spotty" relationship between rooms, porches, and terraces









ASPECTS OF FORMAL STRUCTURE:
While the geometry of House I is basically additive, House II is interlocking As opposed to the Iranian courtyard with its *talar*, in the Turkistani house the walls lining the courtyard become the most important features

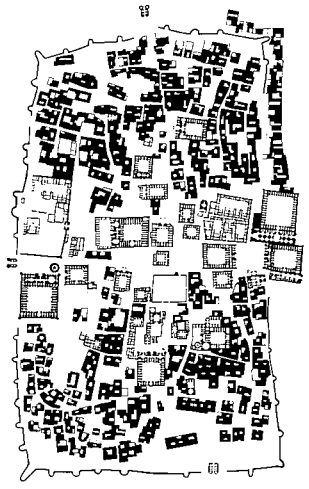
LEFT TOP: East-west section cutting through main court and through women's court

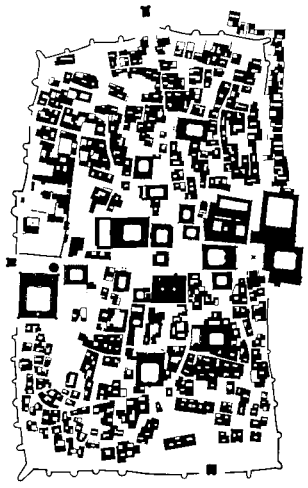
LEFT MIDDLE: North-south section cutting through north room of main court, porch preceding it, south room, and rentable space

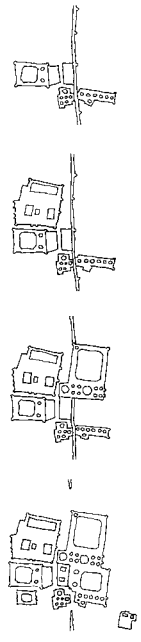
LEFT BOTTOM: North-south section cutting through women's quarters and court

KHIVA

TURKISTAN







Khiva, the seat of an independent Khanate for most of its existence, is the city at the western end of the chain of Turkistani cities Its relative isolation and the dry central Asian climate (hot in summer, cold in winter) are responsible for the preservation of its adobe structures (city walls and houses) and wood construction A number of the forest of columns in the Friday Mosque was erected in the 11th century

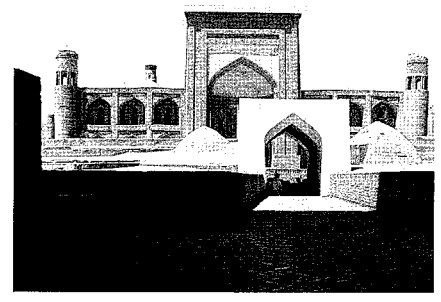
Khiva has preserved its architectural continuity up to the early part of the 20th century The last recorded Islamic building, a mosque complex, dates from 1910

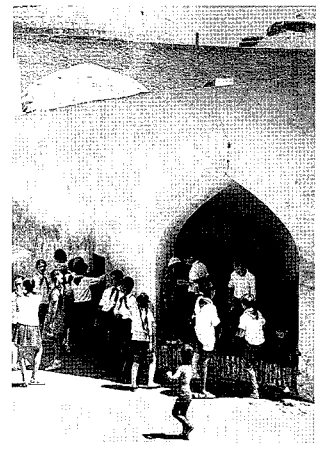
ABOVE: From the Aq Mosque looking toward two madrasas A fragment of street is created by the projecting platforms In the background is the Emir's palace

FAR LEFT: Nolli-type plan of Ichan-Qala of Khiva reveals the extent and the figural quality of the ensemble of public buildings and thus the realm of public activity This representation of the city is similar to those of Isfahan, Kerman, and Bukhara

LEFT: Figure ground plan does the opposite by equalizing the public and private structures into a unified whole *(umma)*

ASPECTS OF FORMAL STRUCTURE:
FROM TOP TO BOTTOM: Chronological illustrations of the breaching of the Inner City wall The void formed by the original bazaar, a piece of the old wall and the new bazaar is ultimately filled by the madrasa, which completes the central urban space



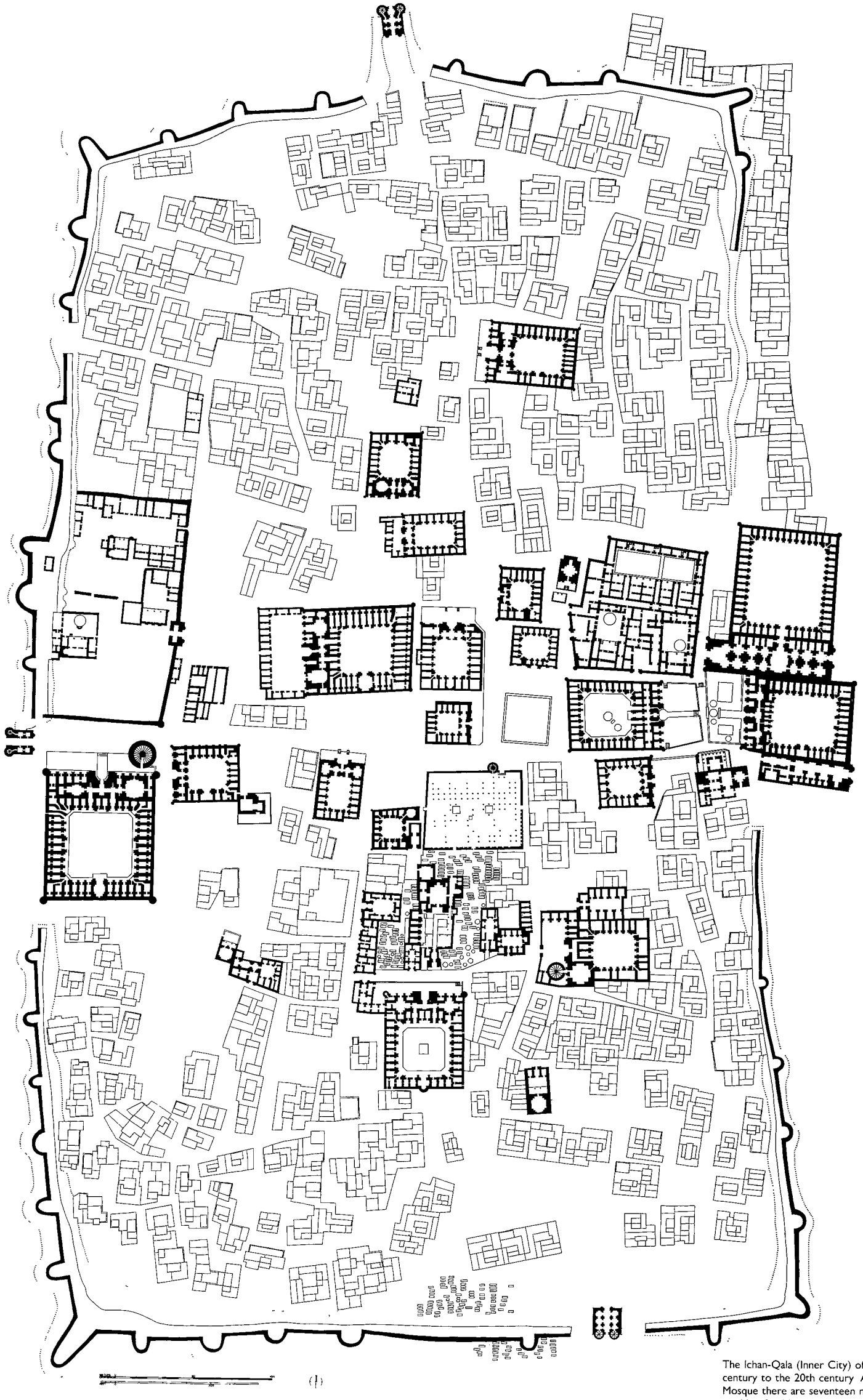


TOP RIGHT: *Iwan* of Qutlugh Murad-Inak Madrasa from *iwan* of Ali kuli khan Madrasa

MIDDLE RIGHT: School children playing in "found" spaces proportionate to their own size

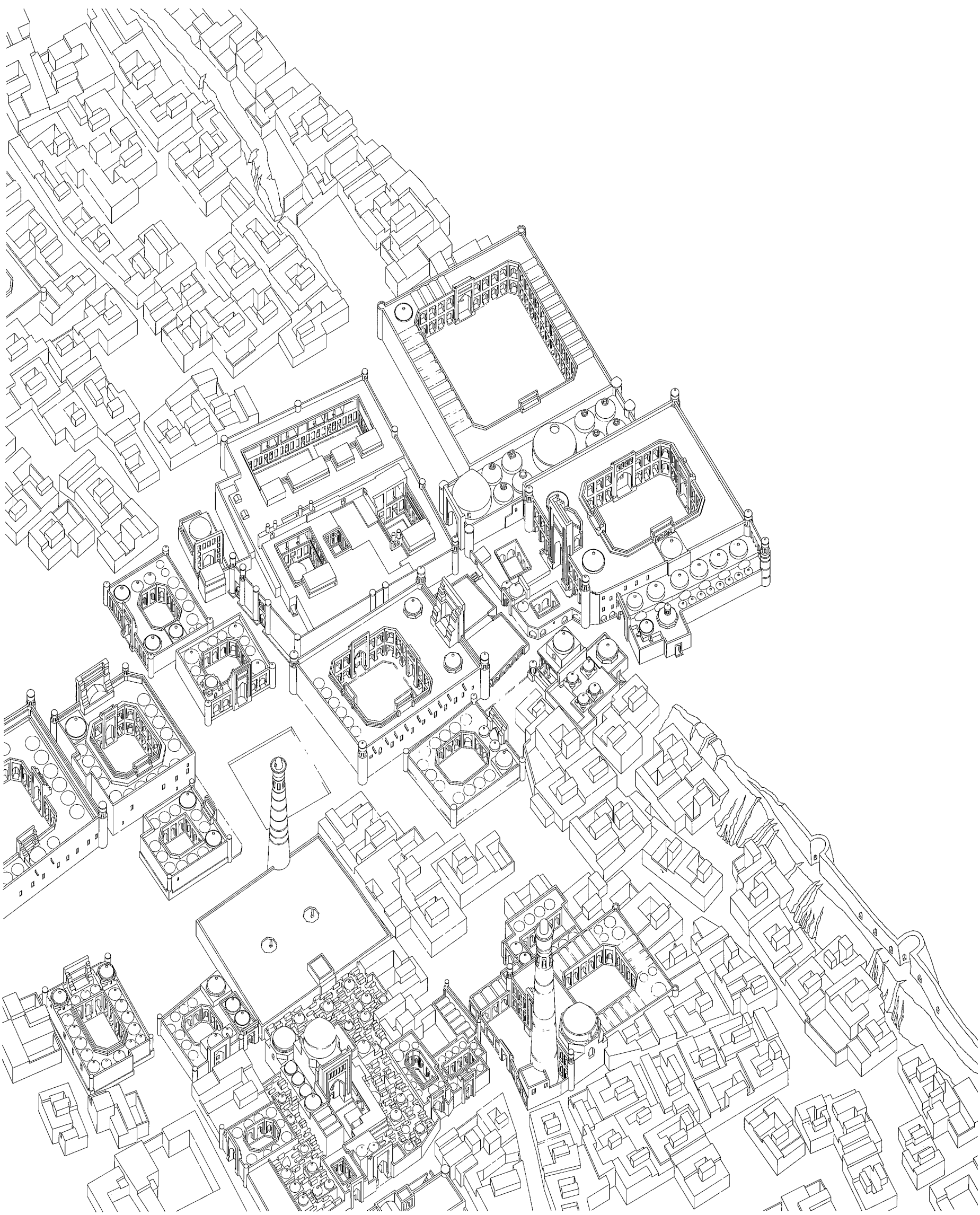
RIGHT: Comparative example of very simple *iwan*-like entry to house in Isfahan

LEFT: Roofscape toward the south with Islam Khodja Mosque and minaret (finished in 1910)

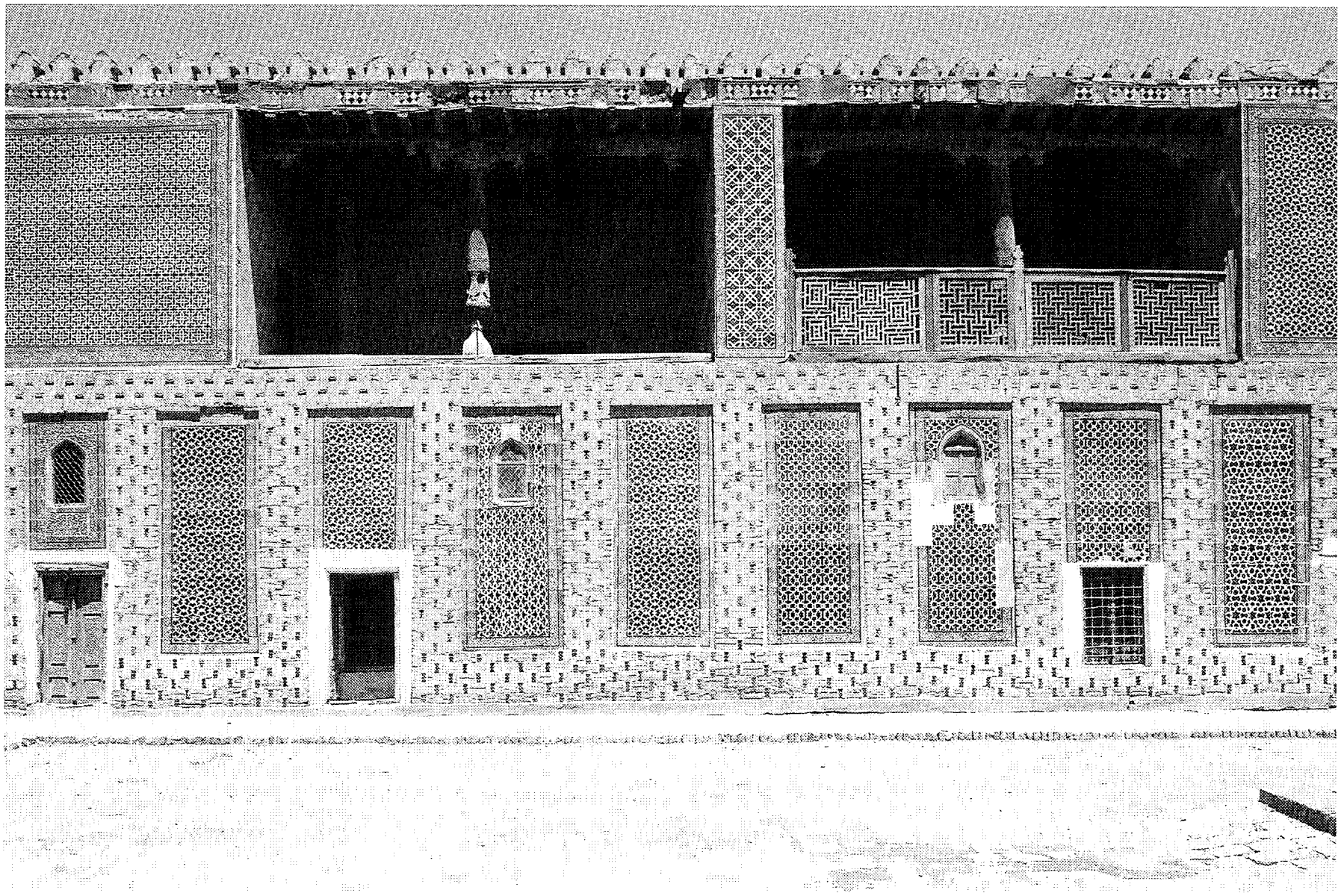


The Ichan-Qala (Inner City) of Khiva built from the 14th century to the 20th century Aside from the Friday Mosque there are seventeen madrasas among the ensemble of public buildings To the south of the Friday Mosque is a cemetery built at least three layers deep

One of two openings in the roof of the large Friday Mosque of Khiva (begun 11th c) The contrast between the blinding light and the dark forest of columns is a hallmark of the earlier Turkistani mosque



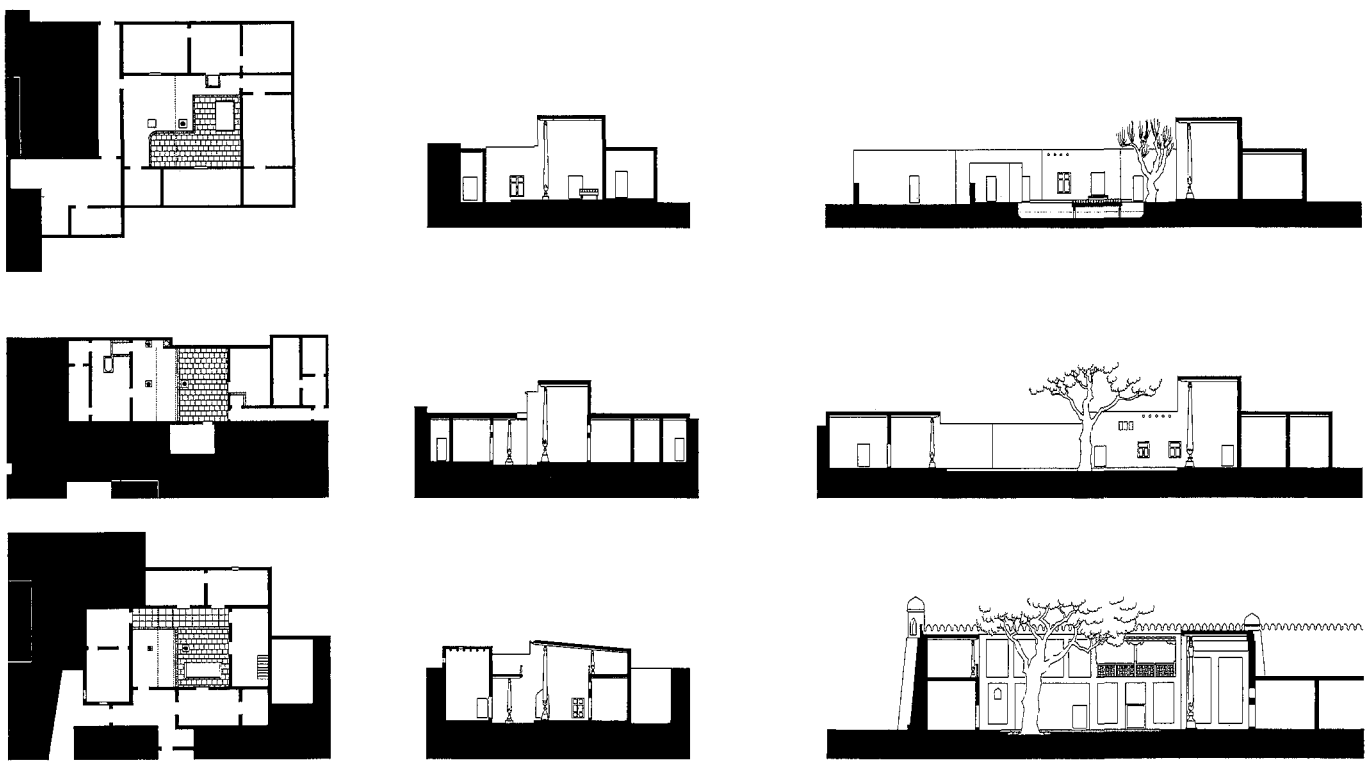
Axonometric of cluster of public buildings at eastern gate Clockwise from upper right: Allah Kuli Khan bazaar and madrasa (1835), bazaar leading in from eastern gate (1806), Aq Mosque (1657) in front of baths, Madrasa Outlugh Murad-Imak (1804–12) with mosque below, Palace Tash Hawli (1830–38) with harem court at north



Khiva, palace, the khan's harem court, looking north to the residences of the novices

THREE HOUSES

KHIVA

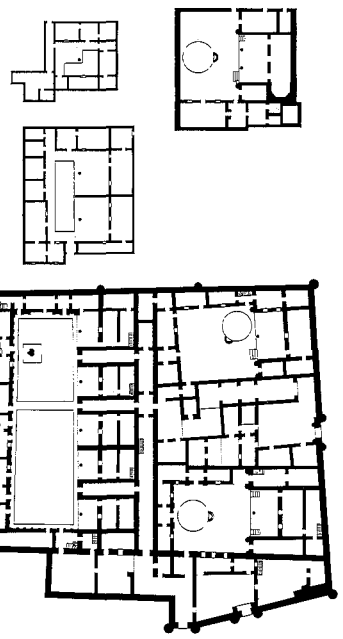


The agglomeration of houses constitutes the bulk of the urban texture in Khiva Groups of residences acquire a certain independence from the city fabric, a situation not typical of Iranian cities The residual spaces have no clear urban purpose other than circulation Nevertheless, the housing texture has a coherence of its own due to the use of the single, exaggerated *talar* and common construction methods and materials

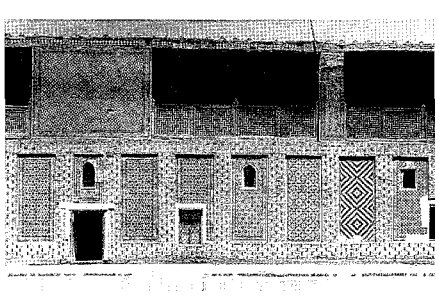
A single object—a totem-like wood column—has replaced the spatial integrity of the "Iranian" courtyard In this way the precious building material, wood, is celebrated

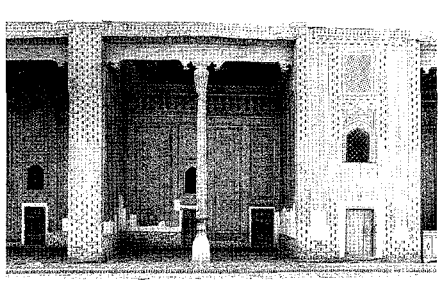
On an urban scale, a plethora of madrasas constitutes a parallel pattern In general, the madrasas in Khiva (as with those in Iran and Turkistan) are organized around a "pure" court with their entrances announced by exaggerated *iwans* Yet, unlike the examples of Iran, they are often positioned face-to-face *(kosh)*

A progression of typical houses with single-column *iwans* facing north At the top, the *iwan* faces a blank wall; in the middle, the *iwan* faces a lower porch; and at the bottom, the *iwan* faces a two-storey porch Each variation is accompanied to its right by a "suburban" version of the same section (The bottom section, however, is through the harem of the emir's palace in the city) In the increasing intensity, all extended versions reestablish the courtyard space



Plans of four houses, progressing from typical one single-column *iwan* house to the emir's palace The latter is divided into a block of five single-column *iwans* (harem) and two large courts with auxillary rooms The court intrigues can almost be read from the pattern of the circulation The single-court building at top right, was for receiving guests into the emir's keep

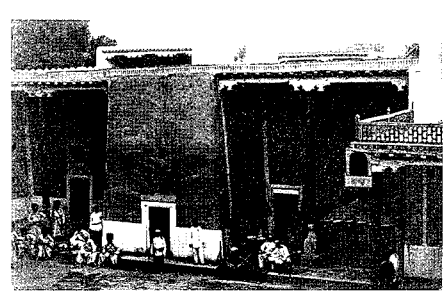


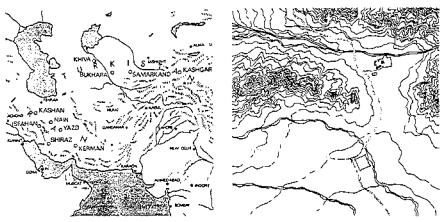


FAR LEFT: Looking north at the wall of the palace harem The tiled wall on the upper floor seems to defy gravity, as if ready to slide left or right This is another example of a mass perceived as being skin-deep, almost fabriclike

MIDDLE LEFT: *Iwan* of one of the emir's wives The prestige of her position is acknowledged through the prominence of her *iwan*

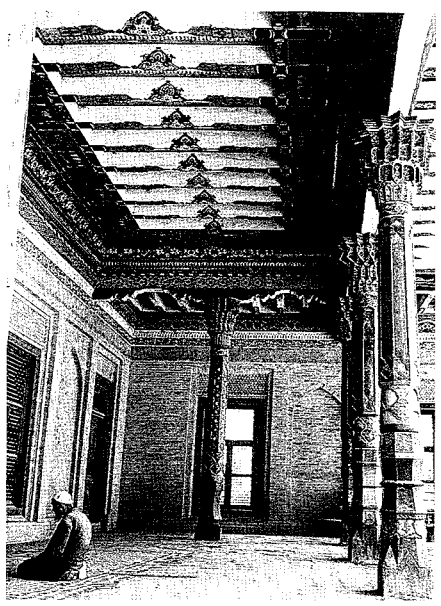
BELOW: Soldiers of Czarist Russia visiting the city, thus showing the space in a different use

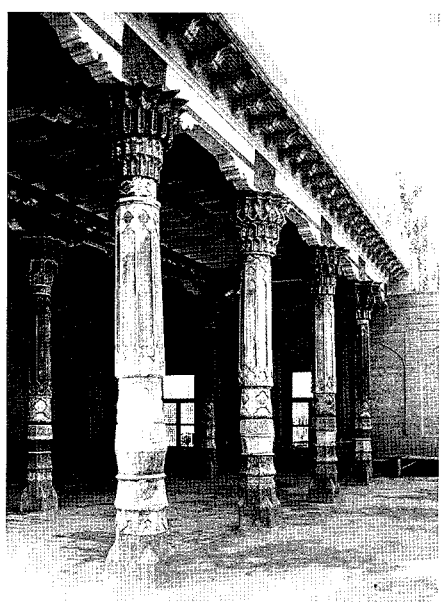


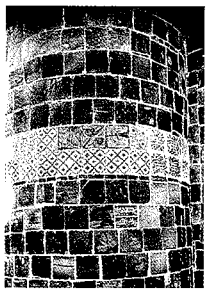


RELIGIOUS AND MORTUARY COMPLEX
KASHGAR

TURKISTAN

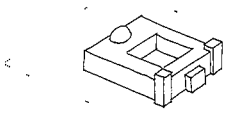






ABOVE LEFT: Man praying in front of the *mihrab* of the high mosque (Photo: Jin Oubu)

ABOVE: Exterior and porch of high mosque near the main entry

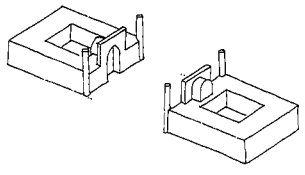


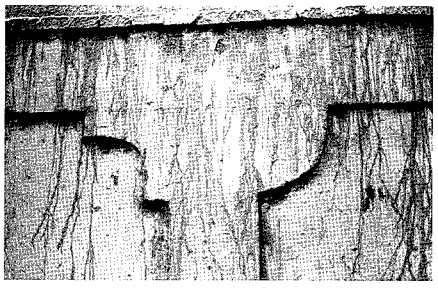
ABOVE: The Great Mosque, concluding the space of the entire complex

Islam came to the Sinkiang province of China between the 10th and 11th centuries By the 15th century it became a major religion Before Islam, Chinese architecture in this province was characterized by wooden columns, densely spaced beams with flat roofs, sun-dried mud brick, and freely laid out plans After Islam the decorative patterns of Han, Hui, Tibet, Tadjik, and Uighur were fully absorbed Three major kinds of Islamic buildings appeared: the mosque, the library, and the tomb

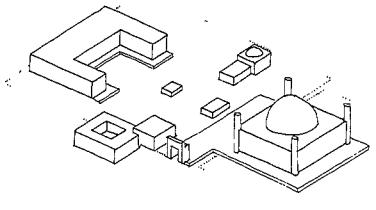
The Abba Khodja tomb complex is located outside Kashgar It is the shrine of Mahran Khodja, the daughter of Satuk Boghra Khan Satuk Boghra Khan was the leader who first embraced Islam and brought it to this province The complex consists of a tomb, four mosques, and a library all built in the 18th century and added to over the years The main gate, high mosque, low mosque, and library are all of the same period The high mosque has an open hall with two towers at its corners and two other towers next to the gate The low mosque and library lie behind the high wall The main tomb's four large arches support a dome whose towers are decorated with green glazed tile The great mosque is surrounded by a wall and has a large front hall with a forest of columns Its rear hall is lower in height and has a series of arches

LEFT: Detail of tiles on main tomb buildings

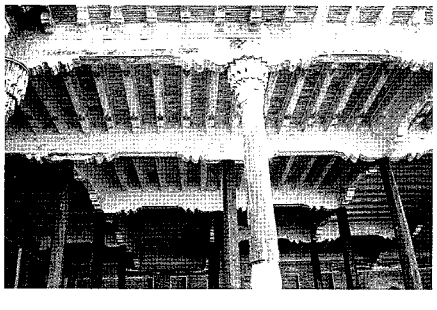




LEFT: Detail of wall and pilaster along entry wall



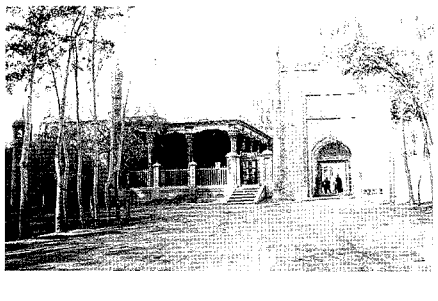
ASPECTS OF FORMAL STRUCTURE:
In spatial terms, this complex of buildings can be placed between the singular mosque of western Islam (Iran) and various other religious complexes, (from top to bottom): first, the singular, self-contained religious building, typical of western Islam Second, two religious buildings facing each other, creating a space in between *(kosh)* Third, a "campus" of religious buildings created on a fairly regular field Fourth, a typical Chinese architectural complex of religious buildings showing a linear path of procession

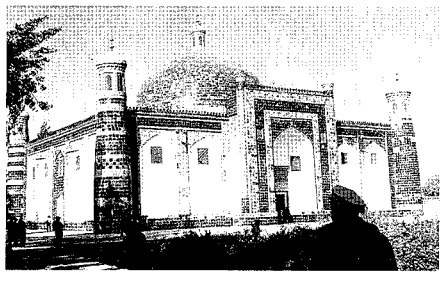


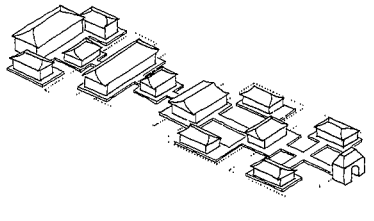
LEFT: Detail of high mosque at the entry

BELOW LEFT: Main entry to religious complex with the high mosque to the right of the entry

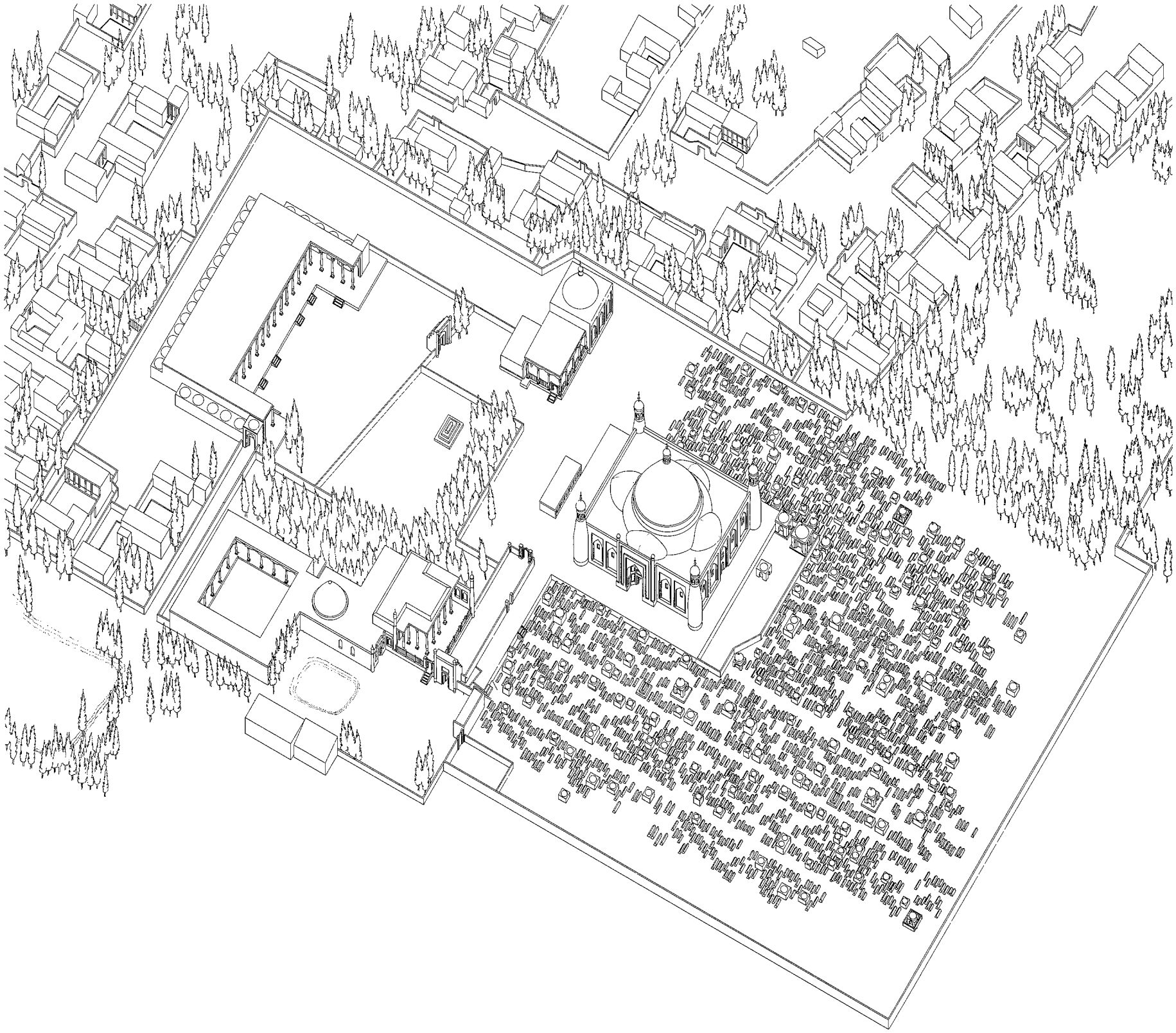
BELOW: Tomb of Abba Khodja and Shrine of Mahran Khodja







BELOW: Chinese professor sketching the main tomb



Axonometric of Aba Khodha Mosque from southeast